September 1959
50¢

CQ

UNIVERSITY OF ILLINOIS
LIBRARY
AUG 31 1959
CHICAGO

VHF Contest
ountain Topping

The Radio Amateur's Journal

GOOD REASONS FOR
ADVANCED SSB
PERFORMANCE
IN

COLLINS S/LINE

OPERATING AND FRONT PANEL SIMPLICITY

Front panel switching and simplified controls offer the amateur a bonus of ease of operation and optimum operati efficiency. A gear reduced, 20-kc-per-dial-turn tuning knob allows easy, accurate tuning. And the tuning dial lights up for easy readability. All knob turn effortlessly.

RF FEEDBACK

MECHANICAL FILTERS

LIGHTWEIGHT

AUTOMATIC LOAD CONTROL

COMPLETE STATION COMPATIBILITY

The Collins S/Line equipment, handsomely packaged in desk-top cabin comprise a complete, lightweight amateur station. Individual units on which a system may be built include: 32S-1 Transmitter, 75S-1 Receiver, 30S Linear Amplifier, 516F-2 Power Suppl and 312B-4 Speaker Console.

DUAL OR SINGLE PTO CONTROL

FREQUENCY STABILITY

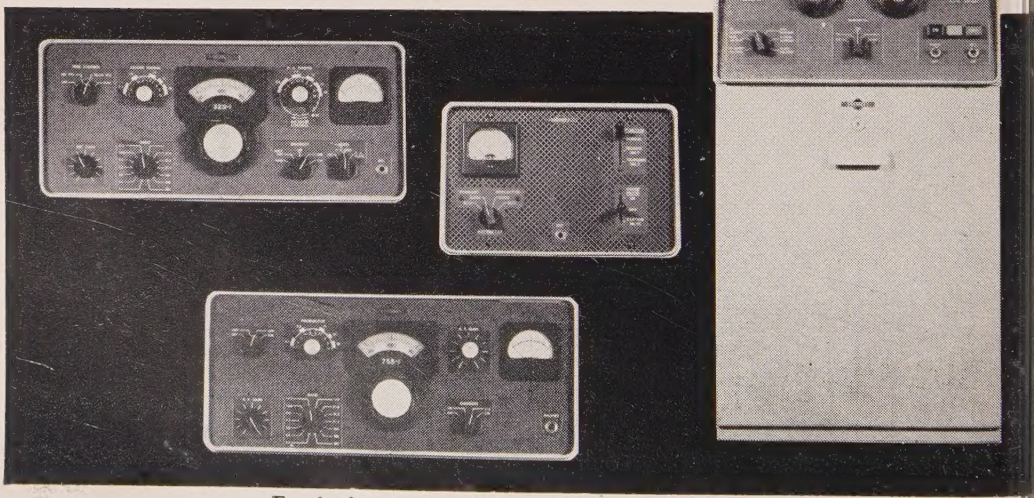
ONE KC DIVISION ON ALL BANDS

Now, you can meet anyone on a sked and not have to retune. Clearly seen 1 calibrated dial eliminates frequency searching.

MORE QSO'S PER KC

These are the outstanding features that make Collins S/Line the advan system for amateurs. For maximum talking power and greatest operat convenience, specify Collins S/Line. See your nearest Collins distributor tod

COLLINS

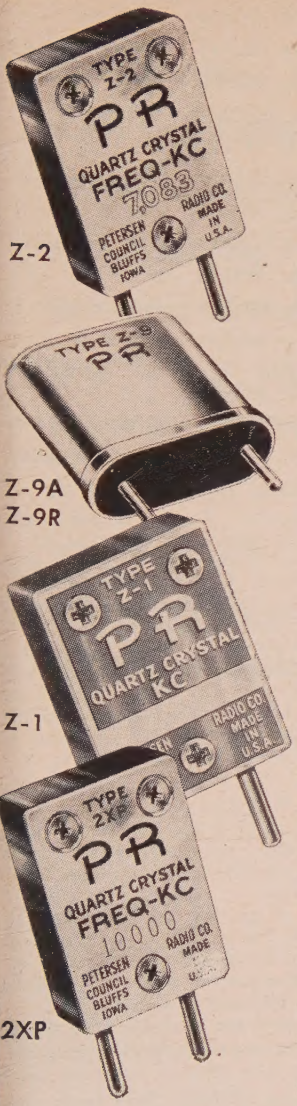


For further information, check number 1 on page 126.

It pays to insist on

PR *crystals*

STANDARD OF EXCELLENCE SINCE 1934



Z-2

Z-9A
Z-9R

Z-1

2XP

AMATEUR TYPES

40, 80 and 160 Meters, PR Type Z-2

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, hermetically sealed; ±500 cycles..... **$2.95** Net

24 to 27 Mc., PR Type Z-9A

Third overtone; multiplies into either 2-meter or 6-meter band; hermetically sealed; calibrated 24 to 27 Mc., ±3 Kc.; .050" pins. **$4.95** Net

50 to 54 Mc., PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ±15 Kc.; .050" pins. **$6.95** Net

COMMERCIAL TYPES

Commercial Crystals available from 100 Kc. to 70 Mc. Prices on Request.

SPECIAL TYPES

Type Z-1 Aircraft
3023.5 Kc., .005% ..... **$3.45** Net

VHF Type Z-9R, Aircraft
For Lear, Narco and similar equipment operating in the 121 Mc. region, requiring crystals in 30 Mc. range. Each.... **$4.95** Net

Type Z-1, MARS and CAP
Official assigned frequencies in the range. Calibrated to .005%. 1600 to 10000 Kc..... **$3.45** Net

Type Z 1, TV Marker
Channels 2 thru 13.... **$6.45** Net
4.5 Mc. Intercarrier, .01% ..... **$2.95** Net
5.0 Mc. Signal Generator, .01% ..... **$2.95** Net
10.7 Mc. FM, IF, .01% ..... **$2.95** Net

Type 2XP
Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.
600 to 12000 Kc., (Fund.) ±5 Kc..... **$3.45** Net
2001 to 25000 Kc. (3rd Overtone) ±10 Kc..... **$4.45** Net

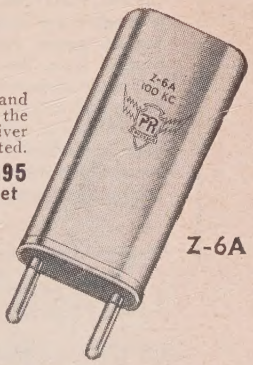
ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

TYPE Z-9R CITIZENS BAND CLASS "D"
FCC assigned frequencies in megacycles: 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225; calibrated to .005% ..... **$2.95** Net

TYPE Z-9R RECEIVER CRYSTALS FOR CITIZENS BAND CLASS "D"—Specify I.F. frequency, also whether I.F. is above or below transmitter frequency. Calibrated to .005%. **$2.95** Net

TYPE Z-9R RADIO CONTROL CLASS "C"
FCC assigned frequencies in megacycles: 26.995, 27.045, 27.095, 27.145, 27.195, 27.255; calibrated to .005% ..... **$2.95** Net

Type Z-6A, Frequency Standard
To determine band edge. To keep the VFO and receiver properly calibrated.
100 Kc. . . **$6.95** Net



Z-6A

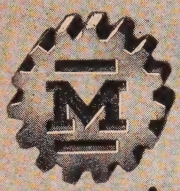
Silver Anniversary Year 1934-1959

PETERSEN RADIO CO., Inc. 2800 W. Broadway
COUNCIL BLUFFS, IOWA

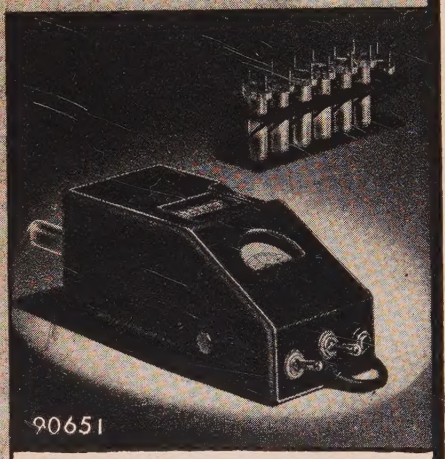
EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.

For further information, check number 3 on page 126.

Designed for



Application



The No. 90651

GRID DIP METER

The No. 90651 MILLEN GRID DIP METER is compact and completely self contained. The AC power supply is of the "transformer" type. The drum dial has seven calibrated uniform length scales from 1.5 MC to 300 MC plus an arbitrary scale for use with the 4 additional inductors available to extend the range to 220 kc. Internal terminal strip permits battery operation for antenna measurement.

JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY

MALDEN

MASSACHUSETTS

Wayne Green, W2NSD — *editor*
Barry Briskman, K2IEG — *assistant editor*

department editors

Bob Adams, W3SW — *sideband*
Frank Anzalone, W1WY — *contest calendar*
Urban Le June Jr., W2DEC — *dx*
Ken Grayson, W2HDM — *surplus*
Sam Harris, W1FZJ — *vhf*
George Jacobs, W3ASK — *propagation*
Byron Kretzman, W2JTP — *rtty*
Marvin Lipton, VE3DQX — *club bulletins*
Louisa Sando, W5RZJ — *yl*
Charles Schauers, W6QLV — *ham clinic*
Don Stoner, W6TNS — *novice & semiconductor*

contributing editors

E. L. Klein, W4UHN — *printed circuits*
Norman McLaughlin, W3LNT — *grounded grids*

CQ, the Radio Amateurs' Journal is published
active hams by active hams. Not affiliated with
clubs or other political groups, CQ endeavors to b
true and honest reporter for those interested in
hobby. Suggestions for improvement are welcomed

Authors would do well to send for the CQ S
sheet which will explain our confused system of
breviations and symbols. The article "Author Auth
(October 1952 CQ) tells all about how to w
articles for CQ, how much we pay, etc. Reprints
this article are available from CQ if you have b
improvident in keeping up your radio library.

CQ CERTIFICATES:

The WPX Award is granted for two-way con
with certain number of amateurs in different pre
of the world. Full details are contained in the W
Record Book which is available for 15c from CQ.
plication forms are free.

The WAZ Award is granted for contacting all
the amateur zones of the world. Current standing
amateurs working for this award will be found in
DX column. A DX Zone map of the world is avail
free from CQ. Send stamped envelope.

Special SB Certificates are available from the S
band Department for operators providing proof
contact (QSL cards) with stations in 50, 75 and
countries using two-way sideband. Send cards dire
to the SB Editor.

TECHNICAL INFORMATION:

Please check the 11-year cumulative index which
published in the January 1956 CQ for informa
about articles in past issues of CQ. The Decem
1956 to 1958 CQ yearly indexes will bring you u
date. Most back issues are available at $1 from
Check our "Back Issue" ad for details on those
available. Reprints of the Cumulative Index are a
able free. For further information see the Ham C
column.

DISCLAIMER:

The authors and editors do the best they ca
make everything as correct as possible in the arti
If for any reason any of them should happen to
we hasten to point out that everything is experime
and we guarantee nothing.

◀For further information, check number 4 on page

CQ—The Radio Amateur's Journal

300 West 43rd Street, New York 36, N. Y.

September 1959
vol. 15, no. 9

TCS Conversion ..... B. O. Bretz, WA6BQR **30**

Monte Carlo Calling ..... W. I. Orr, W6SAI/3A2AF **37**

Put Your Ranger On SSB ..... W. Binkley, K5GMN **41**

In The Beginning, Part Six ..... F. D. Whitmore, W2AAA **42**

Multi-Band Vertical ..... R. G. Minarik, W9GJY **45**

Some ABC's Of Amplifiers ..... C. C. Drummeller, W5EHC **46**

11,133 More FCC Violations ..... M. J. Hindin, W6EUV **48**

A Versatile 10 Watts ..... B. Perthel, W9MWD **49**

Tripling To 1296 ..... W. C. Taft, W1WD/2 **52**

Tribute To The Late H. P. Broughton, K2AE **55**

VHF Contest Results **59**

Departments

W2NSD	9	Citizens Band	60	DX	75
Scratchi	16	Surplus	62	Ham Clinic	80
QSL Contest	18	Semiconductors	65	Sideband	82
Letters To Editor	20	Propagation	68	Contest Calendar	84
MARS Bulletins	51	YL	70	New Products	122
VHF	56	Novice	72	Book Reviews	122

publisher **S. R. Cowan**
production manager **Bill Gardner, Jr.**
circulation manager **Harold Weisner**
editorial production **David Fish & Robert Jordan**

Branch Advertising Offices:

Ted E. Schell, 2700 West 3rd Street, Los Angeles 57, Calif. DUnkirk 2-4889.

Charles W. Hoefer, 1664 Emerson Street, Palo Alto, Calif. DAvenport 4-2661.

advertising representative **Jack Schneider**
advertising representative **Dick Cowan**
classified advertising **Kathi Gerace**

—(title registered U.S. Post Office) is published monthly by Cowan Publishing Corporation. Executive and editorial offices at 300 st 43rd Street, New York 36, N. Y. Telephone JUdson 2-4460. Second Class Postage paid at New York, N. Y.

BSCRIPTION RATES: U.S.A. and Possessions, APO, FPO, Canada and Mexico: one year $5.00; two years $9.00; three years $13.00. n-American and foreign: one year $6.00; two years $11.00; three years $16.00.

REIGN SUBSCRIPTIONS: Great Britain: RSGB, New Ruskin House, Little Russell St., London WC 1, England. Australia: Technical ok Co., 297 Swanston St., Melbourne C 1, Victoria, Australia.

nted in U.S.A. Entire contents copyright 1959 by Cowan Publishing Corporation. CQ does not assume responsibility for unsoted manuscripts.

tmaster: Send Form 3579 to CQ, 300 West 43rd Street, New York, N. Y.

BUILD YOUR OWN HEATHKIT® HAM GEAR

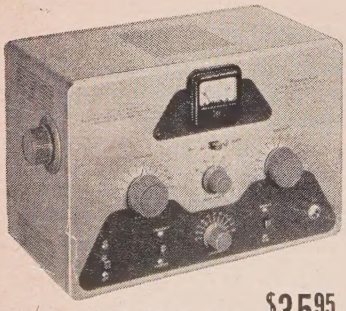
HEATHKIT HAM EQUIPMENT IS DESIGNED BY HAMS WHO KNOW YOUR PROBLEMS AND NEEDS.

PROVEN, "ON THE AIR" PERFORMANCE

"SENECA" VHF HAM TRANSMITTER KIT

Beautifully styled and a top performer of highest quality throughout. The "Seneca" is a completely self-contained 6 and 2 meter transmitter featuring a built-in VFO for both 6 and 2 meters, and 4 switch-selected crystal positions, 2 power supplies, 5 radio frequency stages, and 2 dual-triode audio stages. Panel controls allow VFO or crystal control, phone or CW operation on both amateur bands. An auxiliary socket provides for receiver muting, remote operation of antenna relay and remote control of the transmitter such as with the Heathkit VX-1 Voice Control. Features up to 120 watts input on phone and 140 watts on CW in the 6 meter band. Ratings slightly reduced in the 2 meter band. Ideal for ham operators wishing to extend transmission into the VHF region. Shpg. Wt. 56 lbs.

HEATHKIT VHF-1 **$159.95**



HEATHKIT DX-20 **$35.95**

DX-20 CW TRANSMITTER KIT

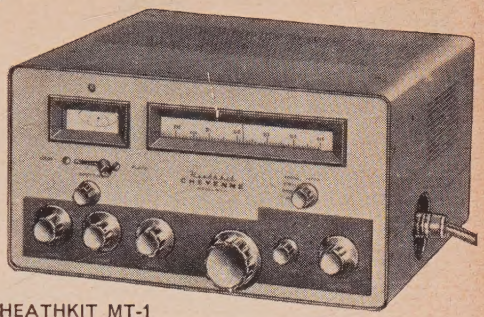
Designed exclusively for CW work, the DX-20 provides the novice as as the advanced-class CW operator with a low cost transmitter featu high operating efficiency. Single-knob bandswitching covers 80, 40, 20 and 10 meters using crystals or an external VFO. Pi network output cir matches antenna impedances between 50 and 1,000 ohms. Employ single 6DQ6A tube in the final amplifier stage for plate power inpu 50 watts. A 6CL6 serves as the crystal oscillator. The husky power su uses a heavy duty 5U4GB rectifier and top-quality "potted" transfor for long service life. Easy-to-read panel meter indicates final grid or p current selected by the panel switch. Complete RF shielding to mini TVI interference. Easy-to-build with complete instructions provi Shpg. Wt. 19 lbs.

HEATH COMPANY Benton Harbor, Michigan — a subsidiary of Daystrom, Inc

Mobile Gear...for the Ham on the Go!

"CHEYENNE" MOBILE HAM TRANSMITTER KIT

All the fun and excitement . . . plus the convenience of mobile operation are yours in the all-new Heathkit "Cheyenne" transmitter. The neat, compact, and efficient circuitry provides you with high power capability in mobile operation, with low battery drain using carrier controlled modulation. All necessary power is supplied by the model MP-1 described below. Covers 80, 40, 20, 15 and 10 meters with up to 90 watts input on phone. Features built-in VFO, modulator, 4 RF stages, with a 6146 final amplifier and pi network (coaxial) output coupling. High quality components are used for long service life and reliable operation, along with rugged chassis construction to withstand mobile vibrations and shock. Thoughtful circuit layout provides for ease of assembly with complete instructions and detailed pictorial diagrams to insure success. A spotting switch is also provided. A specially designed ceramic microphone is included to insure effective modulation with plenty of "punch". Plan now to enjoy the fun of mobile operation by building this superb transmitter. Shpg. Wt. 19 lbs.



HEATHKIT MT-1
$99.95

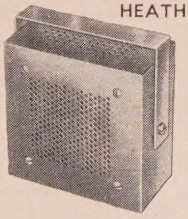
"COMANCHE" MOBILE HAM RECEIVER KIT

Everything you could ask for in modern design mobile gear is provided in the "Comanche" . . . handsome styling, rugged construction, top quality components . . . and, best of all, a price you can afford. The "Comanche" is an 8-tube superheterodyne ham band receiver operating AM, CW and SSB on the 80, 40, 20, 15 and 10 meter amateur bands. A 3 mc crystal lattice-type IF filter permits the receiver to use single conversion without image interference, and at the same time creates a steep sided 3 kc flat top IF bandpass characteristic comparable to mechanical type filters. The neat, compact and easy-to-assemble circuitry features outstanding sensitivity, stability and selectivity on all bands. Circuit includes an RF stage, converter, 2 IF stages, 2 detectors, noise limiter, 2 audio stages and a voltage regulator. Sensitivity is better than 1 microvolt on all bands and signal-to-noise ratio is better than 10 db down at 1 microvolt input. One of the finest investments you can make in mobile gear. Shpg. Wt. 19 lbs.

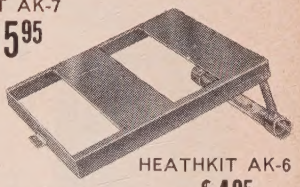
HEATHKIT MR-1
$119.95

MOBILE SPEAKER KIT

A matching companion speaker for the "Comanche" mobile receiver. Housed in a rugged steel case with brackets provided for easy installation on fire wall or under dashboard, etc. Uses 5 PM speaker with 8 ohm voice coil. Measures 5" H. x 5" W. x 2½" D. Shpg. Wt. 4 lbs.

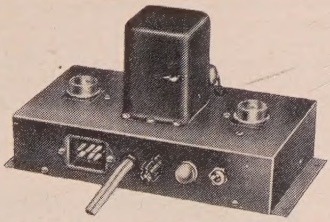


HEATHKIT AK-7
$5.95



HEATHKIT AK-6
$4.95

HEATHKIT MP-1
$44.95



MOBILE BASE MOUNT KIT

The AK-6 Base Mount is designed to hold both transmitter and receiver conveniently at driver's side. Universal mounting bracket has adjustable legs to fit most automobiles. Shpg. Wt. 5 lbs.

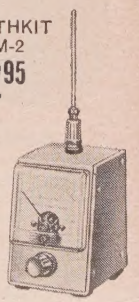
MOBILE POWER SUPPLY KIT

This heavy duty transistor power supply furnishes all the power required to operate both the MT-1 Transmitter and MR-1 Receiver. It features two 2N442 transistors in a 400 cycle switching circuit, supplying a full 120 watts of DC power. Under intermittent operation it will deliver up to 150 watts. Kit contains everything required for complete installation, including 12' of heavy battery cable, tap-in studs for battery posts, power plug and 15' of connecting cable. Chassis size is 9 1/16" L. x 4¾" W. x 2" H. Operates from 12-14 volt battery source. Circuit convenience provided by self-contained relay which allows push-to-talk mobile operation. Shpg. Wt. 8 lbs.

POWER METER KIT

HEATHKIT PM-2
$12.95

This handy unit picks up energy from your mobile antenna and indicates when your transmitter is tuned for maximum output. A variable sensitivity control is provided. Features a strong magnet on a swivel-mount for holding it on a car dashboard or other suitable spot. Has its own antenna or may be connected to existing antenna. Sensitive 200 ua meter. Shpg. Wt. 2 lbs.



HEATHKIT®

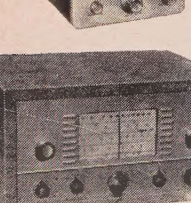
COMPANION UNITS

HEATHKIT TX-1 $234.95

"APACHE" HAM TRANSMITTER KIT

The many features and modern styling of the "Apache" will provide you with just about everything you cou ask for in transmitting facilities. Emphasizing high quality the "Apache" operates with a 150 watt phone inp and 180 watt CW input. In addition to CW and phone operation, built-in switch selected circuitry provic for single-sideband transmission using the SB-10 External adapter. The newly designed, compact and stal VFO provides low drift frequency control necessary for SSB transmission. A slide rule type illuminated rot ing VFO dial with full gear drive vernier tuning provides ample bandspread and precise frequency settin The bandswitch allows quick selection of the amateur bands on 80, 40, 20, 15 and 10 meters. This unit a has adjustable low-level speech clipping and a low distortion modulator stage employing two of the n 6CA7/EL34 tubes in push-pull class AB operation. Time sequence keying is provided for "chirpless" break CW operation. The final amplifier is completely shielded for TVI protection and neutralized for grea stability. A cooling fan is also provided. The formed one-piece cabinet with convenient access hatch provi accessibility to tubes and crystal sockets. Die-cast aluminum knobs and control panel escutcheons add to attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 a 72 ohms. A "spotting" push button enables the operator to "zero beat" an incoming frequency without putti the transmitter on the air. Equip your ham shack now for top transmitting enjoyment with this outstand unit. Shpg. Wt. 110 lbs. Shipped motor freight unless otherwise specified.

HEATHKIT SB-10 $89.95



SINGLE SIDEBAND ADAPTER KIT

Designed as a compatible plug-in adapter unit for the TX-1 "Apache" transmitter, this unit you operate on SSB at a minimum of cost, yet does not affect the normal AM and CW functi of the transmitter. By making a few simple circuit modifications, the DX-100 and DX-10 transmitters can be used, utilizing all existing RF circuitry. Extremely easy to operate and t the adapter employs the phasing method for generating a single-sideband signal, thus allow operation entirely on fundamental frequencies. The critical audio phase shift network is supp completely preassembled and wired in a sealed plug-in unit. Produces either a USB, LSB or I signal, with or without carrier insertion. Covers 80, 40, 20, 15 and 10 meter bands. An eas read panel meter indicates power output to aid in tuning. A built-in electronic voice control anti-trip circuit is also provided. 10 watts PEP output. Unwanted sideband suppression i excess of 30 db and carrier suppression is in excess of 40 db. An EL84/6BQ5 tube is used linear RF output. Shpg. Wt. 12 lbs.

MODIFICATION KIT: Modifies DX-100 and DX-100-B for use with the SB-10 Adap Model MK-1. Shpg. Wt. 1 lb. $8.95.

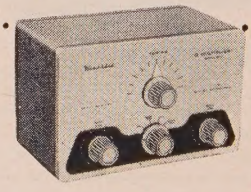
HEATHKIT AR-3 $29.95

(less cabinet)

ALL-BAND RECEIVER KIT

A fine receiver for the beginning ham or short wave listener, designed for high circuit efficiency and easy construction. Covers 550 kc to 30 mc in four bands clearly marked on a slide-rule dial. Transformer operated power supply. Features include: bandswitch, bandspread tuning, phone-standby-CW switch, phone jack, antenna trimmer, noise eliminator, RF gain control and AF control. Shpg. Wt. 12 lbs.

CABINET: Opt. extra. No. 91-15A. Shpg. Wt. 5 lbs. $4.95.



HEATHKIT QF-1 $9.95

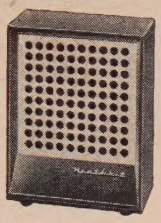
"Q" MULTIPLIER KIT

Useful on crowded phone and CW bands, this kit adds s tivity and signal rejection to your receiver. Use it with any receiver having an IF frequency between 450 and 460 kc d not AC-DC type. Provides an effective "Q" of approxim 4,000 for extremely sharp "peak" or "null". The QF powered from the receiver with which it is used. Shpg. Wt.

OF DISTINCTIVE QUALITY

ACCESSORY SPEAKER KIT

Handsomely designed and color styled to match the "Mohawk" receiver this heavy duty 8" speaker with 4.7 ounce magnet provides excellent tone quality. Housed in attractive ⅜" plywood cabinet with perforated metal grille. Speaker impedance is 8 ohms. Shpg. Wt. 7 lbs.

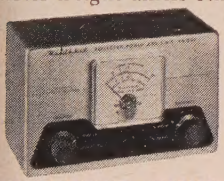


HEATHKIT AK-5
$9.95

HEATHKIT RX-1 $274.95

"MOHAWK" HAM RECEIVER KIT

Styled to match the "Apache" transmitter the "Mohawk" ham band receiver provides all the functions required for clear, rock-steady reception. Designed especially for ham band operation this 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc and covers all the amateur frequencies from 160 through 10 meters on 7 bands with an extra band calibrated to cover 6 and 2 meters using a converter. Specially designed for single sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled wired and aligned front end coil bandswitch assembly assures ease of construction and top performance of the finished unit. Other features include 5 selectivity positions from 5 kc to 500 CPS, bridge T-notch filter for excellent heterodyne rejection, and a built-in 100 kc crystal calibrator. The set provides a 10 db signal-to-noise ratio at less than 1 microvolt input. Each ham band is separately calibrated on a rotating slide rule dial to provide clear frequency settings with more than ample bandspread. Front panel features S-meter, separate RF, IF and AF gain controls, T-notch tuning, T-notch depth, ANL, AVC, BFO, Bandswitch tuning, antenna trimmer, calibrate set, calibrate on, CW-SSB-AM, receive-standby, upper-lower sideband, selectivity, phone jack and illuminated gear driven vernier slide rule tuning dial. Attractively styled with die-cast aluminum control knobs and escutcheons. No external alignment equipment is required for precise calibration of the "Mohawk". All adjustments are easily accomplished using the unique method described in the manual. An outstanding buy in a communications receiver. Shpg. Wt. 66 lbs. Shipped motor freight unless otherwise specified.



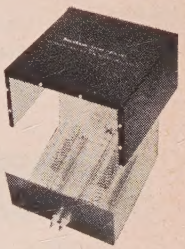
HEATHKIT AM-2
$15.95

REFLECTED POWER METER KIT

The AM-2 measures forward and reflected power or standing wave ratio. Handles a peak power of well over 1 kilowatt of energy and covers 160 through 6 meters. Input and output impedance provided for 50 or 75 ohm lines. No external power required for operation. Use it also to match impedances between exciters or RF sources and grounded grid amplifiers. Shpg. Wt. 3 lbs.

BALUN COIL KIT

Match unbalanced coaxial lines, found on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance with this handy transmitter accessory. Capable of handling power input up to 200 watts, the B-1 may be used with transmitters and receivers covering 80 through 10 meters. No adjustment required. Shpg. Wt. 4 lbs.

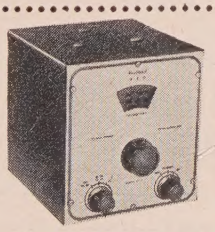


HEATHKIT B-1
$8.95

HEATHKIT VX-1
$23.95

ELECTRONIC VOICE CONTROL KIT

Eliminate hand switching with this convenient kit. Switch from receiver to transmitter by merely talking into your microphone. Sensitivity controls allow adjustment to all conditions. Power supply is built in and terminal strip on the rear of the chassis accommodates receiver and speaker connections and also a 117 volt antenna relay. Shpg. Wt. 5 lbs.



HEATHKIT VF-1
$19.50

VFO KIT

Far below the cost of crystals to obtain the same frequency coverage this variable frequency oscillator covers 160, 80, 40, 20, 15 and 10 meters with three basic oscillator frequencies. Providing better than 10 volt average RF output on fundamentals, the VF-1 is capable of driving the most modern transmitters. Requires only 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a. Illuminated dial reads direct. Shpg. Wt. 7 lbs.

Save 1/2 or more...with Heathkits

HEATHKIT DX-100-B **$189.50**

DX-100-B PHONE AND CW TRANSMITTER KIT

A long standing favorite in the Heathkit line, the DX-100-B combines modern styling and circuit ingenuity to bring you an exceptionally fine transmitter at an economical price. Panel controls allow VFO or crystal control, phone or CW operation on all amateur bands up to 30 mc. The rugged one-piece formed cabinet features a convenient top-access hatch for changing crystals and making other adjustments. The chassis is punched to accept sideband adapter modifications. Featured are a built-in VFO, modulator, and power supply, complete shielding to minimize TVI, and a pi network output coupling to match impedances from 50 to 72 ohms. RF output is in excess of 100 watts on phone and 120 watts on CW. Band coverage is from 160 through 10 meters. For operating convenience single-knob bandswitching and illuminated VFO dial on meter face are provided. A pair of 6146 tubes in parallel are employed in the output stage modulated by a pair of 1625's. Shpg. Wt. 107 lbs. Shipped motor freight unless otherwise specified.

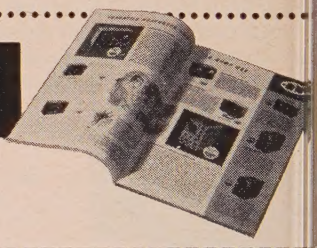
HEATHKIT DX-40 **$64.95**

DX-40 PHONE AND CW TRANSMITTER KIT

An outstanding buy in its power class the DX-40 provides bo phone and CW operation on 80, 40, 20, 15 and 10 meters. single 6146 tube is used in the final amplifier stage to provi full 75 watt plate power input on CW or controlled carr modulation peaks up to 60 watts for phone operation. Mod lator and power supplies are built in and single-knob ban switching is combined with the pi network output circuit complete operating convenience. Features a D'Arsonval mo ment panel meter. A line filter and liberal shielding provi for high stability and minimum TVI. Provision is made three crystals easily accessible through a "trap door" in back of the cabinet. A 4-position switch selects any of the th crystals or jack for external VFO. Power for the VFO is av able on the rear apron of the chassis. Easy-to-follow step-by-s instructions let assembly proceed smoothly from start to fin even for an individual who has never built electronic equ ment before. Shpg. Wt. 25 lbs.

Free Send now for latest Heathkit Catalog describing in detail over 100 easy-to-assemble kits for the Hi-Fi fan, radio ham, boat owner and technician.

HEATHKIT



HEATH COMPANY BENTON HARBOR 12, MICH.

pioneer in do-it-yourself electronics

a subsidiary of Daystrom, Inc.

Send latest Free Heathkit Catalog.

All prices and specifications subject to change without notice. Please include postage on orders to be shipped parcel post. 20% deposit is required on all C.O.D. orders. All prices are NET F.O.B. Benton Harbor, Mich., and apply to Continental U.S. and Possessions only.

NAME

ADDRESS

CITY ZONE STATE

QUANTITY	KIT NAME	MODEL NO.	PRICE

For further information, check number 5 on page 126.

. . de W2NSD

never say die

Australia

The amateurs of Australia were thrown into consternation by the revelation that their government had secretly sent frequency proposals to Geneva which called for a huge reduction in some of the present amateur bands. The Postmaster-General was very reluctant to release the proposals, classified "Confidential," to Australian amateurs even after they had been sent to Geneva for distribution to all of the other countries. Little wonder, for when they were finally known the amateurs set up a howl that echoed for days on the floor of Parliament in Canberra. Even with considerable pressure from both the Senate and House of Representatives there seems to be little hope that the Postmaster-General will heed the near 4000 amateurs and reconsider the devastating slash in amateur frequencies proposed.

Official Australian Proposals for Amateur Bands: 3500-3700 *kc*; 7000-7100 *kc*; 14000-14250 *kc*; No changes in 10 & 15M.

Parametric Amplifiers

Quite a few CQ readers shrugged off the article on Parametric Amplifiers by our VHF editor Sam Harris, W1FZJ, as just another Larson E. Rapp spoof. No little wonder for the contraption was not only almost unheard of at the time, but looked weird in diagram form and promised to accomplish the impossible.

For any of you who are still cocking an eyebrow about this I might point out that the November 1958 CQ was carefully read by just about every research group in the world and has been the basis of a lot of frantic experimenting. It has come to the point now where no radar or other sensitive VHF receiver is up to date unless it has a parametric amplifier. In an article in the June Scientific American we find that Sam is given full credit for being the first man to build a practical and workable parametric amplifier. That this unit was built first for use on six and two meters at an amateur radio station is another feather in the cap of ham radio. The article in the November CQ was the first description anywhere of a practical working parametric amplifier . . . quite a first for CQ and for ham radio.

The impact of the parametric amplifier has been such that from this time on no *VHF* or *UHF* radio receiver that requires sensitivity or freedom from adjacent channel interference will be able to be sold unless it has one in the input. More and more companies are trying to make the varactors, the heart of the parametric amplifier, and surely in time their products will develop reliability. Even Japan is getting going on the manufacture of varactors . . . so it shouldn't be long before the price becomes reasonable.

Losing Frequencies

We can lose frequencies from within as well as without, you know. We are not only faced with the I.T.U. Geneva sword over our head on the lower frequencies, but also with the FCC investigation of the *VHF* channels. In the June Editorial I mentioned the Motorola proposals for *VHF* reallocations. Their suggested drastic cutting back of the amateur frequencies alarmed many readers and got them to sit down and write to the FCC, to Motorola, to their Congressman, and to me. This no doubt helped the Post Office a bit, but the FCC just gave a little groan at the higher piles of mail and wondered why all this talk and no action.

Stand by for a revelation. Stand by for an idea that you may have never heard of before. A whole new concept! Oh, relax, I'm just being sarcastic again . . . the idea is that we will hold on to our frequencies by using them, not by just talking about them. How come you never built that simple 220 *mc* rig you read about? What do we have to do, bring out a 220 *mc* Communicator to get some activity on the band? Ditto 420 and 1215. The VHF Handbook by Herb Johnson W6QKI has all sorts of good transmitters and converters for these bands. I have published everything I could get my hands on in CQ. What more can I do? It is, I think, up to you now.

Geneva

Present plans are for CQ to have two representatives at Geneva. Since this represents practically the entire editorial staff of CQ we

How To Pass FCC COMMERCIAL RADIO OPERATOR License Exams

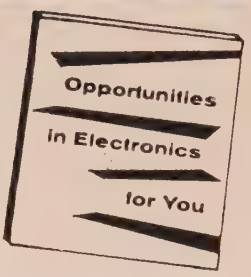
How to get a Commercial FCC License

Free . . .

Tells where to apply and take FCC examinations, location of examining office, scope of knowledge required, approved way to prepare for FCC examinations, positive method of checking your knowledge before taking the examination.

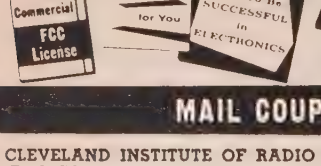
GET YOUR FCC TICKET IN A MINIMUM OF TIME!

Get this Amazing Booklet FREE



TELLS HOW . . .

1. Tells how thousands of brand-new, better paying radio-TV-electronics jobs are now open to FCC License Holders.
2. Tells how we guarantee to train and coach you until you get your FCC License.
3. Tells how our amazing Job-Finding Service helps you get the better paying job our training prepares you to hold.



GET ALL 3 FREE!

MAIL COUPON NOW!

CLEVELAND INSTITUTE OF RADIO ELECTRONICS
Desk CQ-56, 4900 Euclid Bldg., Cleveland 3, Ohio
(Address to Desk No. to avoid delay)

I want to know how I can get my FCC ticket in a minimum of time. Send me your FREE booklet, "How to Pass FCC License Examinations" (does not cover exams for Amateur License), as well as amazing new booklet, "Successful Electronics Training."

Name ..... Age .....

Address .....

City ..... Zone..... State.....

FOR PROMPT RESULTS SEND AIR MAIL

CQ-56

will not be able to spend the entire four months of the conference there. The matters of interest to us, the frequency allocations, are expected to come up along in October. It would be nice to be able to spend four months in beautiful Geneva with a practically unlimited expense account just to do a few weeks' work.

Facts and Figures

Every now and then I see a release from somewhere telling how many amateurs we have in this country. From time to time I have even leaked this closely guarded information out through some of the more obscure pages of CQ.

The time has come again. After looking over all of the facts available it seems best to hide this info here in the editorial column where it will never be seen.

The estimated number of amateurs in the U.S. as of September one is 190,000! Actually it is 190,080, but let's forget those eighty or the end just to round things off and make calculations simpler. This breaks down as follows:

General Class	66,200	34.8270%
Advanced Class	53,700	28.2474%
Novice Class	24,100	12.7056%
Conditional Class	22,600	11.9115%
Technician Class	20,800	10.9472%
Extra Class	2,600	1.3613%

Club Bulletin

As you should know, CQ has been sending out a monthly bulletin to the editors of all ham club bulletins for some time now. The purpose of this bulletin is to extract the most interesting information from all of the club bulletins printed throughout the country and make it available for club bulletin editors when they sit down to write their next issue.

Starting this month the circulation of our "CQ NEWS" is being expanded to include the presidents of all of the radio clubs that we know about. A few issues ago we designated a small section of CQ to be torn out bodily filled in with the name and address of your club, and sent in. From this we have worked out a mailing list of several hundred clubs. Undoubtedly there are many more clubs that we still have not heard about. If you are the president of a club or know the president of a club please let us know all about it so we can send out the info.

This monthly Club Bulletin will tell you how to get film and slide shows from CQ for your club meetings. We now have the fantastic KC4AF Navassa Island Expedition film with an accompanying tape recorded narrative for clubs with a tape recorder and 16mm sile projector. We also have a set of slides with tape recording of the same expedition. Slide sets are being prepared on other interesting topics too.

a man named OHM...

an astute scientist . . . long ago proved conclusively that all wire has some resistance . . . and loss. Wind it into the form of a coil and you have greater length of wire, greater loss . . . a fact of vital interest to any prospective buyer of a 3-band beam. Why? George Simon Ohm's law can be applied to show that even the finest coil has some loss . . . the losses in a poor coil can be very high! But Gonset 3-Bander beams have no coil loss at all because no coils are used.

Consider . . . NO COILS . . .

no arcing between turns . . . no humidity or wet weather changes . . . no element droop or sag due to heavy coils! Exclusive Gonset multiple concentric sleeve design gives you full length, full gain beam for superior 3-band, 10-15-20 meter operation . . . low SWR . . . a single RG-8/U concentric feed line.

NO COILS

and now with extra-reinforced mechanical construction.

3-element beam	#3220	124.50
2-element beam	#3219	84.50

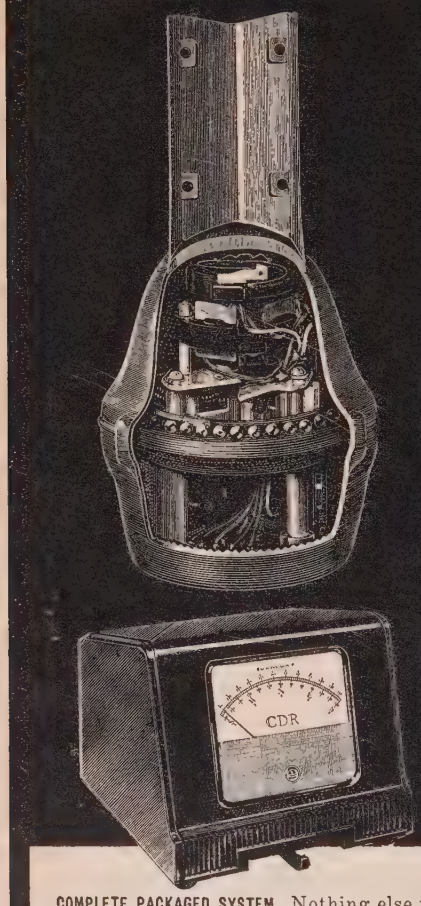
For further information, check number 6 on page 126.

GONSET GONSET *Division of Young Spring & Wire Corporation*

CDR

"HAM-M" ROTOR

install in any type of tower



COMPLETE PACKAGED SYSTEM. Nothing else to buy. Can be installed atop *any* tower, and inside most towers. North-Center meter scale kit. Base plate for internal tower mounts. Anti-meter flutter kit. Mounts in 30 minutes.

EXTREMELY RUGGED. Extra heavy-duty. Thousands now in use, rotating every conceivable antenna combination. Wind-proof, ice-proof, moisture-proof! Won't drift! Provides 3500 in.-lbs. resistance to lateral thrust! Will replace any existing rotor installation and give superior performance. At your distributor. Only $119.50.

CDR HAM ROTOR

Cornell-Dubilier Electric Corp., South Plainfield, N. J.
The Radiart Corporation, Indianapolis, Ind.

For further information, check number 7 on page 126.

Another feature of the Bulletin will be a complete report on the latest FCC actions, in detail. No longer will it be necessary for your club members to wait two or three months to find out what is happening in our hobby. Many of the FCC releases that you might not normally ever see will be available to you and your club through this arrangement . . . and a lot of 'em are mighty interesting. In those cases where petitions are filed with the FCC for changes in the amateur rules we will attempt to not only bring you the FCC release on it, but the full original petition so you can discuss the pros and cons at your meeting.

Make sure your club is on our list. Send us the name of the club, the name, address and call of the president. Let us know if your club has a bulletin, and who edits it. Are you ARRL affiliated? About how many members?

Jamming The Ham

CQ is for amateur radio all the way! But it burns us up when a country like Russia and some of her satellites put out highpower jamming signals with poor harmonic attenuation which interfere with other radio services —especially our ham frequencies!

We think this should be a matter of discussion at the ITU Ordinary Administrative Radio Conference now in session at Geneva complete with some good tape recordings played loudly.

If the Russian leaders *do not* have enough CONFIDENCE in their Communist aims and their people, and must jam so-called "misinformational" shortwave broadcasts, then why don't they at least use some of their technical engineering skill which they brag about and design equipment that will not interfere with certain "innocent" radio services — including amateur?

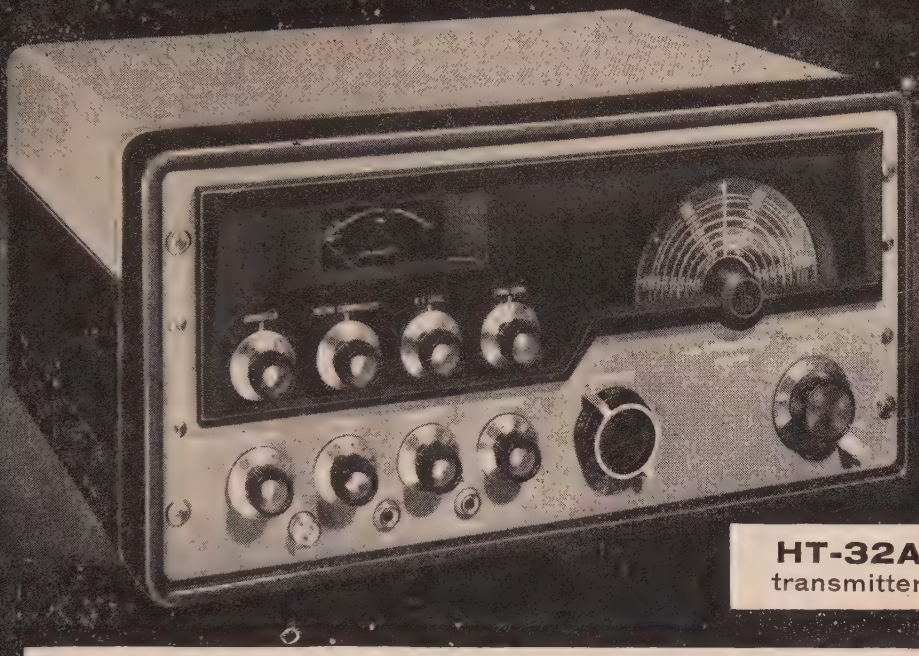
Why the highpower jammers anyway? Local lowpower jamming equipment is just as effective. A 150 microvolt signal from a 2 watt transmitter can certainly blank out a 1 microvolt signal from a transmitter putting out 100,000 watts!

Another point — why doesn't Russia jam selectively? No organization? What good does it do them to jam broadcasts of football, baseball and other games, as well as news broadcasts in English and other languages that are not understood by the majority of the Russian people?

We admit that the *truth* might change many misconceptions of capitalistic endeavor, and the Russian leaders are afraid to allow their people to hear it. That's their business. But why don't they approach this jamming business in a *cultured* way and remember that the airways do not belong exclusively to Communist nations?

The *free* countries do NO jamming — those of us who live in them listen to what we desire, including Radio Moscow!

One Thing is *Crystal Clear*—Your Signal



HT-32A
transmitter

Exclusive HT-32A High Frequency Crystal Filter System a major, proven advance... cuts unwanted sideband at least 50 db.

Now proven superior—vastly superior to any other type filter—is Hallicrafters' exclusive 5.0 mc. quartz crystal filter system.

Result of a three-year research program, the system makes possible, for the first time, *high frequency filtering.* Result; unprecedented rejection of unwanted sideband—50 db. or more—and the *cleanest signal of all,* bar none.

This and another major technical advance—Hallicrafters' exclusive Bridged-Tee Modulator—make the HT-32A the most wanted SSB transmitter in history.

Certified for F.C.D.A. Matching Funds.

Export Sales: International Division
Raytheon Manufacturing Company
Waltham, Massachusetts

Compare these features

- **5.0 mc. quartz crystal filter cuts unwanted sideband 50 db. or more.**
- **Bridged-Tee modulator; temperature stabilized and compensated.**
- **SSB, AM or CW output on 80, 40, 20, 15, 10 meter bands.**
- **High stability, gear driven V.F.O.**
- **144 watts peak power input.**
- **3rd and 5th order distortion products down 30 db. or more.**
- **Keying circuit for RTTY.**
- **PTT.**
- **VOX.**

Proof of the HT-32A's superiority is heard on ham bands night after night. Listen. You won't be satisfied with anything but the cleanest signal on the air.

Available with convenient terms from your Radio Parts Distributor.

For further information, check number 8 on page 126

The new ideas in communications are born at . . .

hallicrafters
Chicago 24, Ill.

in "HAM" GEAR & TEST INSTRUMENTS
your BEST BUY is EICO®

U.S. Pat. No. D-184,776

*90-WATT CW TRANSMITTER #720
KIT $79.95
WIRED $119.95

Ideal for veteran or novice. 90W CW, 65W ext. plate mod. 80 thru 10 meters.

"Top Quality"—ELECTRONIC KITS GUIDE

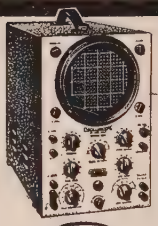
HIGH-LEVEL UNIVERSAL MODULATOR-DRIVER #730
KIT $49.95
WIRED $79.95
Cover E-5 $4.50

Delivers 50W undistorted audio. Modulates xmitters having r.f. inputs up to 100W.

GRID DIP METER #710
KIT $29.95
WIRED $49.95
Includes complete set of coils for full band coverage.

Continuous coverage 400kc — 250mc; 500ua meter.

COLOR & Monochrome DC to 5MC Lab & TV 5" Oscilloscope #460
KIT $79.95 WIRED $129.50



5" Push-Pull Oscilloscope #425
KIT $44.95 WIRED $79.95

PEAK-to-PEAK VTVM #232
KIT $29.95 WIRED $49.95

Vacuum Tube Voltmeter #221
KIT $25.95 WIRED $39.95

RF Signal Generator #324 (150kc-435mc)
KIT $26.95 WIRED $39.95

TV-FM Sweep Generator & Marker #368
KIT $69.95 WIRED $119.95

Dynamic Conductance Tube & Transistor Tester #666
KIT $69.95 WIRED $109.95

Tube Tester #625
KIT $34.95 WIRED $49.95

Send for FREE catalog

EICO® 33-00 Northern Blvd., L.I.C. 1, N.Y.
Show me how to save 50% on 65 models of top-quality: ☐ Ham Gear ☐ Test Instruments ☐ Hi-Fi. Send free catalog & name of neighborhood EICO dealer.

Name .....
Address .....
City .....Zone.....State .....

CQ-9

Add 5% in the West

For further information, check number 9 on page 126.

Come out of your glass house, Mr. K. an stop this nonsense of "freedom prevails in Rus sia and her friends' countries." The whol world has its eyes on the U.S.S.R. and its ear near radio loudspeakers! To listen is to believ . . . and your jammers are certainly makin a big liar out of you!

KW6CL, one of the most formidable ham stations on Wake Island . . . SSB of course. Bob Drake, chief op, was kind enough to let us put through some phone patches from his fine station.

As we proceeded around the world we kept hearing stories of how tough the U.S. Customs would be when we finally arrived at Hawaii. Most of us, worried by the threats, had kept our smuggled opium to a minimum. Some threat! Here we see Customs Inspector KH6BHH (Ed) "Inspecting" Bill Leonard. Whoosh, and we were through.

I took Carl Mosely up on his standing invitation to visit his antenna plant in St. Louis. Here Carl, blueprints in hand, shows me an artist's rendering of the new Mosely plant which has been made necessary by the boom in ham antennas. In addition to the most modern manufacturing facilities possible it will have a large auditorium for local civic events.

Quality . . .

UNSURPASSED — ANYWHERE NEAR THE PRICE!

HQ-170

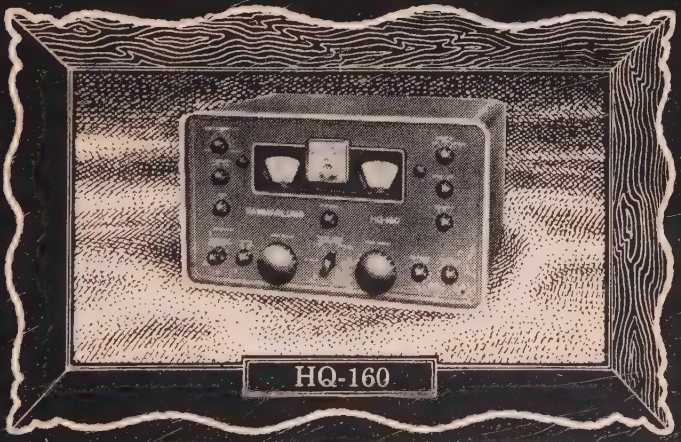
For the amateur who wants the very finest in SSB receivers. Contains all the functions necessary for solid contact in today's crowded bands. 17-Tube superheterodyne. Dual and triple conversion. Separate vernier tuning. Adjustable 60 db notch filter. 6, 10, 15, 20, 40, 80 and 160 meter amateur bands.

$359.00 *

HQ-160

You could pay twice as much, and get no more than the general-coverage HQ-160 quality. Dual conversion. 540 KCS to 31 MCS. SSB. Q-Multiplier. Electrical bandspread. Separate stabilized BFO. Crystal calibrator. Adjustable 60 db notch filter. 13-Tube superheterodyne. Crystal-controlled 2nd IF.

$379.00



Here's the pair that's making history in amateur radio. Never before has so much genuine quality and performance been offered at such low prices. Now the amateur can choose the one he wants and be sure that he's getting the very best buy in either a straight ham band or general coverage receiver.

*Telechron clock-timer, $10 extra.

Established 1910

HAMMARLUND

HAMMARLUND MANUFACTURING COMPANY, INC.
460 West 34th Street, New York 1, N. Y.

For further information, check number 10 on page 126.

NOW you can improve speech intelligibility and cut through QRM with the

SHURE Ranger

MODEL NO. 505T

CONTROLLED MAGNETIC MICROPHONE WITH TRANSISTOR AMPLIFIER

All the advantages of controlled magnetic microphone construction—ability to withstand hard usage and extremes of climate and weather conditions—are yours in this sturdy, reliable microphone. The Ranger 505T has a flat frequency response characteristic (200 to 4000 cps), controlled to provide maximum speech efficiency.

It is ideally suited for SSB-AM transmission. Fits naturally and comfortably in the palm of the hand . . . takes up minimum space in mobile or fixed-station equipment. Equipped with heavy-duty push-to-talk switch.

LIST PRICE $48.50

SHURE The Mark of Quality

SHURE BROTHERS, INCORPORATED
222 HARTREY AVE. • EVANSTON, ILL.

MICROPHONES, HIGH FIDELITY AND ELECTRONIC COMPONENTS

For further information, check number 11 on page 126.

Feenix, Ariz.

Deer Hon. Ed:

There are some things in this world that are just not possible to doing, no matters how hard you trying. Like Hon. Little Old Lady who buying five hundred pounds of steel wool to knitting Hon. Stove. You can't doing it. No indeedy.

What am I talking about?? I talking about being able to keep ahed of Hon. Children, eggspeshyoually those children what being about ten yeers old. All the geenyuses in the world not being able to outsmarting children, when children not wanting to be outsmarted.

Showing you what I meen. Cupple weeks ago frend of mine coming to visit me. He being Cheef Woodmaster for local troop of WARTS. You knowing what WARTS are. That Woodsmen and Rabbit Trailers. Something like Boy Scouts only diffrunt. To being WART you having to be boy between ate and twelve yeers old and having Hon. Parents in the bux so can sending you to WARTS camp for cupple months each summer.

Seeming my frend having problem. As Cheef Woodmaster he hed of WARTS camp. Every so often during day, for chow, for inspeckshun, for swimming, and other reesons, he wanting to getting all WARTS together in one spot, so can counting them and making sure they all there in one peece.

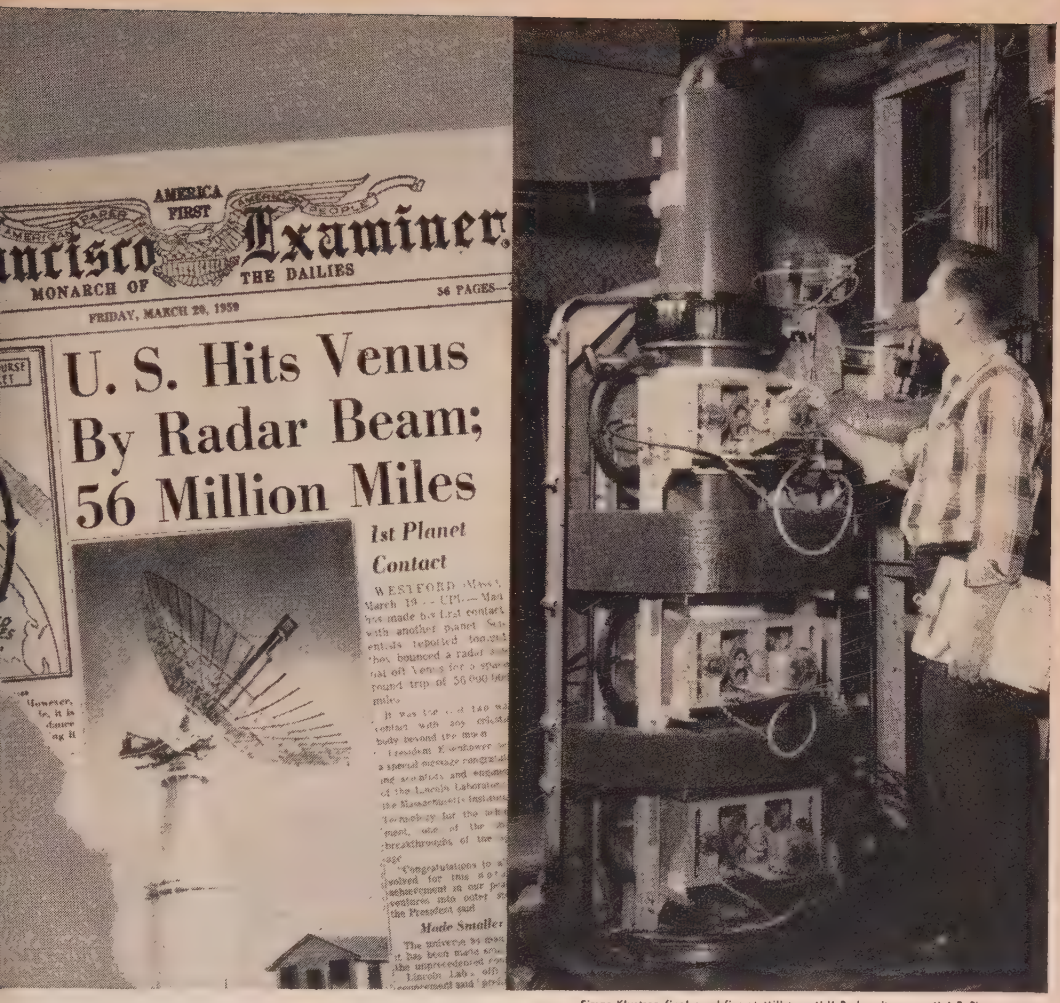
To doing this he ether using poleece whisse or shouting at top of Hon. Lungs. This never reely working, so lately he trying war-surplus siren. This not working ether, and it running down batteries reel quick-like.

So, it seeming Cheef W. reeding abouts new Citizens Band Radio, and he wondering if he could fixing himself up with Citizens Band Xmitter, and having each WART wear small reseever. This way he always be surely each WART heering him when he calling them.

After heering hole story, I telling him not to worrying, as Hashafisti Scratchi are now on the job. After all, it being late in seeson, and there only being ten little fellers left at camp, and how hard can job like this be anyway?

I calling on cupple members of local amchoor club, and in no time we having equipment all reddy. Taking old rig I having around and fix

[*Continued on page* 106]



Eimac Klystron final amplifier at Millstone Hill Radar site. M. I. T. Photo

56 MILLION MILE RADAR CONTACT... SOME DX!

Man's first interplanetary radar contact—a 56 million mile transmission from Earth to the planet Venus and back—was made on February 10, 1958. The final amplifier of the Massachusetts Institute of Technology space radar that made the contact was an Eimac super-power klystron. The range achieved was a hundred-fold increase over previous contacts with the moon. Eimac tubes have played an important part in setting many DX records in the past, but, for the moment, this tops them all.

There are still plenty of opportunities for setting amateur DX records on this planet, though. And, chances are good they'll be set using Eimac tubes. Amateurs who have used Eimac tubes know they're the world's finest tubes for exceptional performance, reliability and ruggedness. Advanced Eimac design and production techniques that make possible tubes like the Venus-bounce klystron, are also responsible for the fine line of Eimac power tubes for amateur use. Conservative Eimac tube ratings give exceptionally long tube life and thus more watt-hours per dollar.

Next time you start making plans for a homemade rig look at the advantages offered by Eimac power tubes. You'll find Eimac tubes in the finest commercially-built equipment too.

EITEL-McCULLOUGH, INC.

SAN CARLOS, CALIFORNIA

For further information, check number 12 on page 126.

hy-gain halo

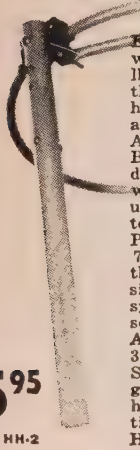
New VHF Mobile System

FROM THE WORLD'S LARGEST MANUFACTURERS OF AMATEUR COMMUNICATIONS ANTENNAS

for 6 meters

High mechanical stability with minimum wind resistance made possible by 1" diameter tubing, heavy duty hardware, and high impact styron insulators.
Resonating capacitor completely weather-sealed in polyethylene cover and cap assembly. THE FIRST ALL-WEATHER PROTECTED HALO.
Perfect match to either 52 or 72 ohm coax made possible through use of hy-gain's exclusive gammaxial gamma match system. No external matching sections required.

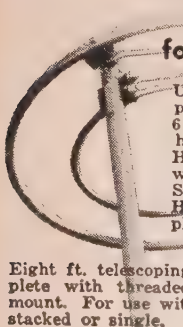
$12.95 Net
Model HH-6



for 2 meters

Extremely small and light weight, weighing less than 1 lb., and only 14" in diameter, the 2M Halo is constructed of high strength heavy wall ½" aluminum tubing.
Adjustable over the entire 2M Band and providing up to 15 db gain over Vertical Whips when working other stations using horizontally polarized antennas.
Perfect match to either 52 or 72 ohm coax made possible through use of hy-gain's exclusive gammaxial gamma match system. No external matching sections required.
Available stacked for additional 3 db gain.
Stacking Kit for 2-Meter hy-gain Halo, complete with all hardware and matching sections. (Order two model HH-2 Halos). Model HHS-2 Net 3.00.

$5.95 Net
Model HH-2



for 6 & 2 meters

Unique hy-gain development permits combination of both 6 and 2 meter Halos to form high effigiency Duo-Bander Halo for operating either band with a single feedline and low SWR. Order both HH-2 and HH-6. Come complete with simplified instructions for assembly.

Eight ft. telescoping aluminum mounting mast complete with threaded stud for any standard mobile mount. For use with either 6M or 2M hy gain Halo, stacked or single.

Model HM Net **$4.95**

SEE YOUR NEAREST DISTRIBUTOR

hy-gain antenna products

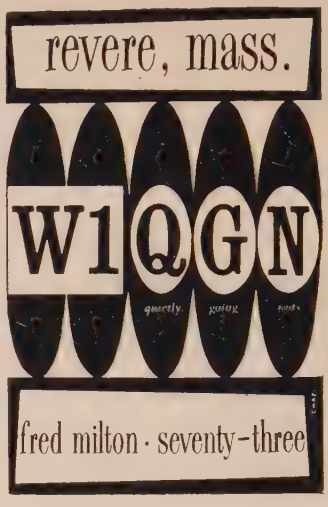
1135 NO. 22ND • LINCOLN NEBRASKA

For further information, check number 13 on page 126.

QSL contest

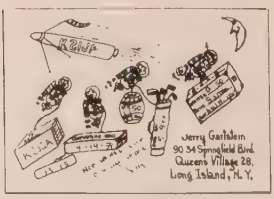
Winner

Fred Milton, W1QGN will undoubtedly be "quietly going nuts" when he discovers his striking entry copped Septembers honors in the fame and fortune department—fortune! One free year of his favorite ham magazine!

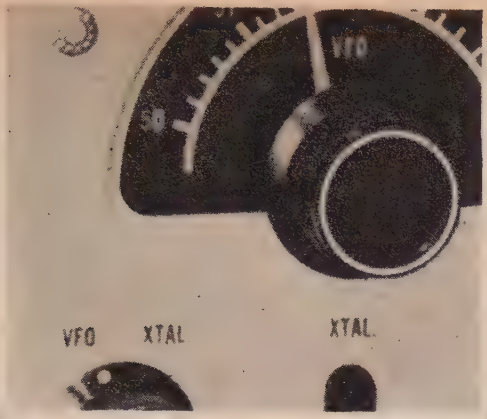


Almost—but not quite

W2JDK, K2IJP, and K1JKA came forth with praiseworthy examples but will have to be happy with fame alone.

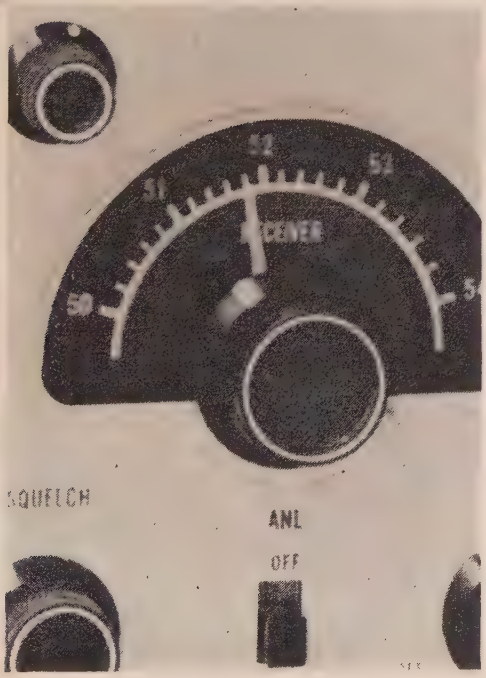


GONSET'S EXCLUSIVE "PACKAGED STATION" CONCEPT



Feature packed...
Value packed...

FIXED STATION *Communicator*



Complete, ready-to-operate station ... transmitter, receiver, power supply ... all in one small cabinet. Just connect antenna and AC power ... operate!

This is truly value-packed equipment, eliminates cost of extra cabinets and chassis for several individual units. Also—transmitter, receiver and associated equipment are designed to work together at full effectiveness. You save money ... you get better operating, integrated equipment, a "packaged station."

Two complete-station models: 10 meter, covering 28-29.7 mcs and 6 meter, covering 50-54 mcs. Both ten and six meter models are identical in general characteristics and appearance.

Transmitter power input is 40-50 watts • Final amplifier uses 6146 tube, has pi network output • Highly stable, calibrated VFO or optional crystal control. VFO has spotting switch to aid tuning • Receivers are selective, sensitive • Adjustable squelch • Noise limiter • "S" meter • Panel mounted speaker • Heavy-duty 115V AC power supply.

For further information, check number 14 on page

G-28, 10 meter, #3204 ... 299.50

G-50, 6 meter, #3221 ... 319.50

GONSET **GONSET** *Division of Young Spring & Wire Corporation*

THAT'S USING YOUR HEAD, OM!

BUILD YOUR LINEAR FROM AN LA-400-C KIT

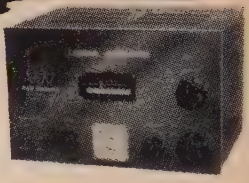


FIGURE IT OUT — HOMEBREW GEAR HAS NO TRADE-IN VALUE and LITTLE RESALE VALUE. Commercially designed gear like the P&H LA-400-C linear always returns a good part of your original investment, even years later.

The LA-400-C KIT is simple to assemble and wire. Everything is furnished and of HIGHEST QUALITY. Improvements over the years have kept the LA-400 series linears TOPS IN THEIR CLASS.

Easily driven to 500 WATTS DC INPUT with ONLY 20 WATTS DRIVE. May be used on SSB, DSB, AM, PM and CW. ALL BANDS 80-10 METERS. Uses four modified 1625s (or 837s on customers order) in CLASS B GG. Untuned LOW Z (50-75 ohms) input. High efficiency 3 element variable pi network puts more power into any antenna or load between 25 and 300 ohms. Paracitic free — TVI suppressed. Meter reads: Grid Drive; Plate Current; Instantaneous RF Amps output. Heavy-duty power supply using 816s. Available in grey table top cabinet 8¾" x 14½" x 10½" or grey or black rack models.

LA-400-C Kit . . . Complete with tubes.....$164.95
LA-400-C Factory Wired and tested.....$219.95

At Your Dealer or Write Dept. 12C

P&H ELECTRONICS INC.
424 Columbia Lafayette, Ind.

For further information, check number 15 on page 126.

Letters . . . . . to the Editor

Flying Hams

Dear Wayne,

Being an active pilot, I generally inject a remark or two in each QSO to see if the other chap is interested in flying. I have been collecting the calls of fellows (and gals) who share this second hobby with me. It would be interesting to make the list as complete as possible. There are probably many articles which could be written for CQ relating flying and ham radio, once some of us get to thinking about the subject. I'm looking forward to hearing from all pilot-hams so I can furnish a more thorough list for CQ.

Jack Gutzeit W2LZX
75-02 168th Street
Flushing 66, N.Y.

W2AS	K2JDV	W3PQR
K2AAN	W2JAO	W4BAZ
W2ABK	K2JQO	K4CVG
W2AQK	W2KAH	K4LIB
W2BHD	W2KZS	K4PQQ
W2BKX	W2LHK	K4IHS
W2BMV	K2LUR	K4USM
K2BPM	W2LZX	W5ULI
W2BUS	W2MHM	W5ZRA
K2BVY	W2MRJ	K6ZXW
W2CAN	W2NRM	K6QPI
K2CTR	W2NSD	K8CQT
W2DHN	W2OBW	W8HWJ
W2DIO	W2OZD	W8MRJ
W2FWG	W2PNR	W9AON
W2GG	W2PZE	W9AXL
K2GBN	W2RHN	K9CJH
W2HBK	W2RNN	K9DOX
W2HDM	K2TAQ	W9KYV
W2HNG	W2VEG	W9RHS
K2HOK	W2VGQ	W9RBX
W2HZC	W2VHS	W9WAF
W2IUX	W2VKS	W9TQT
W2IXT	W2ZGA	KØDWC
W2IXJ	K2ZGZ	KØKFQ
K2IEY	W2ZRY	WØRPE
K2IHD	K2ZMX	WØRXK
K2IND	W1IZ	WØTGL
KN2IUM	W1NPY	XE2FA
W2IVW	W1JIB	
K2JCZ	W1SJJ	

Civil Air Patrol

Dear Sir,

We of the North Hudson Squadron Civil Air Patrol are in need of qualified personnel to help us build, maintain, and operate radio and electronic equipment which we have received from the United States Air Force, the Civil Air Patrol, and Air Force MARS.

The Civil Air Patrol is a civilian auxiliary to the United States Air Force. We are assigned to assist the Air Rescue Service in any mission which may be called in the continental United States.

I hope that any interested parties who may read this letter in your 'Letters to the Editor Column' will contact me by phone (UNion 6-6537) or come to our headquarters any night of the week.

William J. Jackman, CWO, CAP
Information Services Officer
5212 Columbia Avenue, North Bergen, New Jersey

Congrat's

Dear Wayne,

I would like to congratualte you on your fine Editorial

[Continued on page 92]

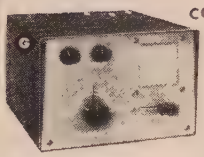
International SUB-ASSEMBLIES

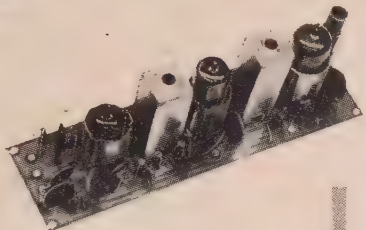
● RECEIVER-CONVERTER
● TRANSMITTER

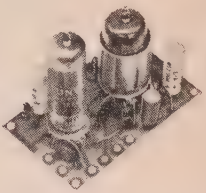
for 20 • 11* • 10 • 6 Meters

*Citizens Radio

Yes! Your own design and your own construction of Ham Radio is now possible with dependable International components. Everything is pretuned and prewired for you. Just order the parts you need and combine them with components you already have . . . or order a complete package made up of the sub-assemblies illustrated and easy-to-follow instructions. Get in on the fun and many practical uses of International sub-assemblies! Order what you need today!



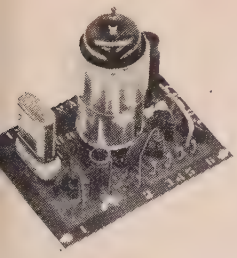




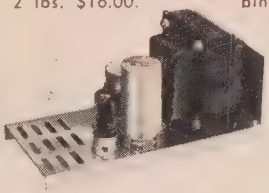
A RF Converter Unit (Printed circuit prewired) Two-tube crystal controlled converter. Converts Ham* frequencies to range of tunable IF. Can be used with IF unit (B) or any communication receiver. 6BA6 and 12AT7 mixer-oscillator. Shipping weight 2 lbs. $14.00. 20 meters, 10 meters, 6 meters.

B IF Unit (Printed circuit prewired) Consists of mixer and tunable local oscillator feeding 262 KC IF stage. Includes noise-limiter and squelch circuits. 6AN8 mixer-oscillator, 6BA6 IF amplifier, diode detector, 6AL5 noise-limiter/squelch. Designed to work with units A and C. Makes dual conversion receiver. Shipping weight 2 lbs. $16.00.

C Audio Unit (Printed circuit prewired) Consists of speech amplifier for crystal microphone, first audio for receiver and power amplifier/modulator stage. Designed to follow unit B. 6AN8 speech amplifier/audio, 6AQ5 power amplifier modulator. Includes output transformer but not speaker. Shipping weight 2 lbs. $13.50.



D Transmitter Unit (Printed circuit prewired) Oscillator and amplifier. Crystal controlled. Requires Unit C for modulation. 6AU8 tube. Shipping weight 2 lbs. Complete with crystal and tube. $14.50.



E Power Supply 115 VAC only (not prewired). Consists of all parts necessary to construct a power supply to operate Units A, B, C and D. Shipping weight 10 lbs. $12.00.

F Power Supply 3-way 6 VDC, 12 VDC or 115 VAC (not prewired). Same as E but will operate from any of three different power sources. Shipping weight 10 lbs. $20.00.

G Cabinet (all metal) Includes all necessary hardware, switches, speakers, panel, case, etc., to combine Units A, B, C, D and E or F into a complete receiver-transmitter assembly. Complete with instructions. Shipping weight 10 lbs. $20.00.

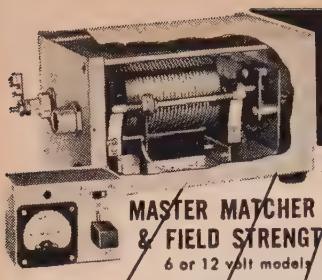
INTERNATIONAL CRYSTAL MFG. CO., INC.

18 N. LEE • OKLAHOMA CITY, OKLA.

HOW TO ORDER:
Order direct from International Crystal. Terms F.O.B. Oklahoma City. Other shipments C.O.D. On C.O.D. orders of $25.00 or more, ⅓ down payment with order is required.

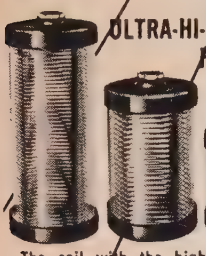
For further information, check number 16 on page 126.

Leaders in the
Design and Manufacturing of
Communication Antennas & Equipment



MASTER MATCHER & FIELD STRENGTH METER
6 or 12 volt models **$24.95**
Automatically tunes entire band by remote control.

ULTRA-HI-"Q" COILS FOR 80, 40, 20, & 15 METERS
Your Choice **$5.95**



The coil with the highest "Q" ever obtained. Tested and found to have a "Q" of well over 515. Use with 36" base sect. 60" whip. 3" Dia.

3 ELEMENT 11M. BEAM
NO. SR-500
Provides a power gain of approx. 2½ (8DB) in forward direction. 10 to 1 interference reduction from sides and rear. VSNR 1. 1 to 1 at band center when fed with 52 OHM coax. . . **$36.00**

THE CITIZEN SR.

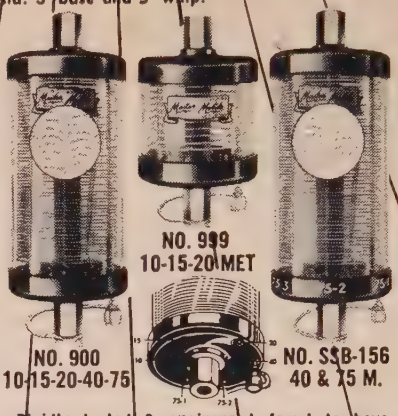
FIBRE-GLAS WHIPS
The Feather-Weight Antenna with Spring-Steel Strength!
Completely weather proof, breakproof antenna with special flexibility that prevents accidental shorting-out against overhead obstructions which can cause loss of signal, serious damage to equipment.
FG-60 60" $4.95
FG-72 72" $4.95
FG-84 84" $5.15
FG-96 96" $5.25
FG-103 103" $6.95

MARINE ANTENNA
Center-loaded, provides max. power on all marine freq. from 2 - 3 meg. Weatherproof, waterproof, 10½' overall length, 4' S.S. plastic-coated whip, 18" impregnated coil. Colorful.
$29.95

11M. CITIZEN BAND ANTENNA
40" base loaded S.S. whip antenna. Fitted with a ¼" dia. brass slug for use with a standard-broadcast 8-ball type cowl mount, also rooftop or trunk lid type mount. Low standing-wave ratio on most of band when fed with a 52 ohm coax.
8B-27 **$12.95**

MARINE LAYDOWN MOUNT
Can be mounted in any position. Adjustable swivel for all positions. Chrome-plated brass, waterproof phenolic insulator.
$19.95

MULTI-BAND ANTENNA COILS
New Plug-in type coils, designed to operate with std. 3' base and 5' whip.



NO. 900
10-15-20-40-75

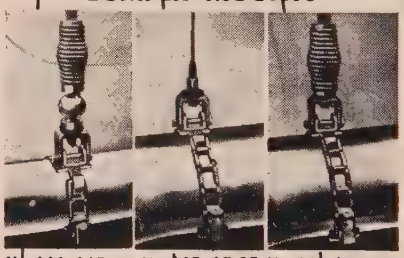
NO. 999
10-15-20 MET

NO. SSB-156
40 & 75 M.

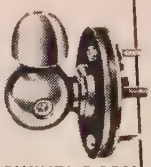
- Rigidly tested & engineered—found to have "Q" of 525
- Handles 500 Watts input
- Operates into a 52-ohm cable
- Positive contact—noise free, trouble free operation
- Weathersealed
- Factory pre-tuned—no adjustments needed.

YOUR CHOICE EACH **$14.95**

BUMPER MOUNTS



No.444 $17.80 No.445 $7.95 No.446 $13.45
Adjustable to any bumper. No holes to drill.



SWIVEL-BODY MOUNT
Smaller version of Master Mobile Mounts, less spring. Swivels, mounts in all positions. ⅜"-24 thread for Magic Wand, and all Master Antennas.
No. J-11 **$2.95**

CITIZEN BAND ANTENNA
26.960-27.225 MC
VSWR under 1.5:1 at resonance. Complete with 50' RG 58/U Cable. Swivel type antenna base for flat or peaked roof installation.
GP 27-11
$34.50

NEW! SLIM-JIM
ALL-BAND BASE LOADING ANTENNA COIL

96" WHIP

FOR 10, 11, 15, 20, 40, 80 METERS
SIZE 1⅜"x 19"
NO. B-1080

Positive action, just slide whip in or out to loading point and lock nut into position.
$17.95

MASTER-MAGIC WAND
New easy-to-install, single band, top-loaded plastic covered fiber glass antenna provides maximum performance at the most useful radiation frequencies.

10 Met.-	5 Ft. L.	$8.95
11 Met.-	5 Ft. L.	8.95
11 Met.-35 In. L.		8.95
11 Met.-45 In. L.		8.95
15 Met.-	5 Ft. L.	8.95
20 Met.-	5 Ft. L.	8.95
40 Met.-	6 Ft. L.	9.95
80 Met.-	6 Ft. L.	9.95

SUPER HI-GAIN CITIZEN BAND
Stacked coaxial antenna provides 5-6 DB gain. 42" high from ground plane. Furn. with 12" ext. for bumper mount.

460-465 MC
No. CL-465
$21.95

All products are for Universal Use-Mobile, Home, Marine, C.A.P., Civil Defense, Emergency, etc.

WRITE FOR FREE CATALOG OF COMPLETE LINE

ELECTRONIC INDUSTRIES ASSOCIATION EIA

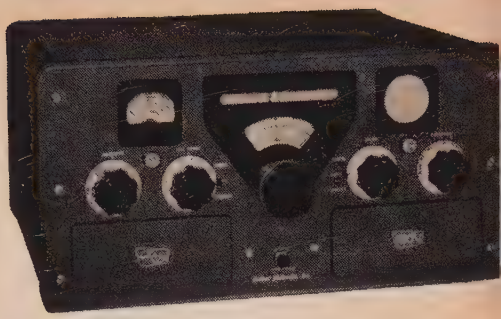
Master Mobile Mounts, Inc.
1306 BOND STREET · LOS ANGELES 15, CALIF.

AT LEADING RADIO JOBBERS EVERYWHERE

For further information, check number 17 on page 126.

THE REVOLUTIONARY NEW CENTRAL ELECTRONICS 100V EXCITER-TRANSMITTER

BROADBANDED! ONLY ONE TUNING CONTROL, THE VFO ITSELF.



CENTRAL ELECTRONICS, THE PIONEER OF AMATEUR SSB IS PROUD TO BRING YOU THE FINAL RESULT OF THREE YEARS OF THE KIND OF PATIENT ENGINEERING, TESTING AND IMPROVING THAT MAKES FOR A SUPERIOR PIECE OF ELECTRONIC GEAR.

MANY OF THE TRIED AND TRUE PRINCIPLES AND FEATURES OF THE ORIGINAL MULTIPHASE EXCITERS HAVE BEEN RETAINED IN THE NEW 100V, ALTHOUGH IN VASTLY IMPROVED FORM. THE USE OF PATENTED BROADBAND CIRCUITRY THROUGHOUT PRACTICALLY ELIMINATES "COCK-PIT" TROUBLE.

REGARDLESS OF YOUR PREFERRED MODE OF OPERATION, IT'S ALL IN THE 100V. SSB, DSB, AM, PM, CW and FSK . . . AND ALL AT THE FLIP OF ONE SWITCH. ALTHOUGH THE 100V WILL PROBABLY FIND IT'S GREATEST USE AS A SINGLE SIDEBAND SUPPRESSED CARRIER EXCITER-TRANSMITTER . . . NO ONE HAS BEEN "LEFT OUT IN THE COLD" IN IT'S DESIGN. THIS IS THE KIND OF A RIG THAT HAMS DREAM ABOUT!

CHECK AND COMPARE THESE FEATURES

STABILITY: The new patented two tube permeability tuned VFO circuit is exceedingly stable and is immune to the effects of line voltage fluctuations and tube ageing. Built like a battle ship, it is tuned by a husky precision lead screw assembly running in ball bearings. This is a VFO to end all VFO's.

FREQUENCY COVERAGE: 80 METERS — 3.5 to 4.5 Mc. 40 METERS — 6.5 to 7.5 Mc. 20 METERS — 13.5 to 14.5 Mc. 15 METERS — 20.5 to 21.5 Mc. 10 METERS — 27.7 to 29.7 Mc. A spare X position provides for the installation of broad-band coils for 160 meters, MARS, etc. OR any 1 Mc. portion of the spectrum between 1.5 Mc. and 25.5 Mc. OR any 2 Mc. portion of the spectrum between 25.5 Mc. and 29.7 Mc. YOU DON'T SETTLE FOR HALF A LOAF OF FREQUENCY COVERAGE WHEN YOU HAVE A 100V!

THE TUNING DIAL: Band scales in the large slide rule window change with the band switch and are calibrated at each 100 KC point. Frequency is read directly in 1 KC increments by the circular KC dial without any computation whatever. Approx. 12 feet of bandspread on each band. A smooth running two-speed tuning knob allows fast tuning at 100 KC per turn and slow tuning at 750 CYCLES per turn. Calibration accuracy is 250 cycles between any two 50 KC points.

METERING: Reads POWER INPUT (0-200 watts) RF AMPS OUTPUT, AC LINE VOLTAGE and CARRIER SUPPRESSION IN DB DOWN TO 70 DB.

MONITORING: A 2" scope provides an instantaneous visual check on non-linearity resulting from improper loading. Also indicates proper setting of carrier injection for 100% AM modulation. Scope presents trapezoid pattern.

OTHER INDICATORS: Below the meter a neon indicator provides a check on the operation of the NEW AUDIO LIMITER CIRCUIT. Below the scope a second neon indicator starts operating if you have the antenna or load mis-matched.

NEW AUDIO FILTER-LIMITER: The new filter is composed entirely of R-C components, yet has the steep side response and rejection characteristics of a four toroid tuned filter but without the usual harsh, ringing effects. Bandpass is 200 to 3700 cycles. This filter precedes the phase shift system and will maintain 50 DB SUPPRESSION OF THE UNWANTED SIDEBAND. The new audio limiter maintains audio drive to the balanced modulator WITHIN 1 DB, REGARDLESS OF HOW HARD THE MIKE IS HIT. IT'S IMPOSSIBLE TO OVERDRIVE THE 100V BALANCED MODULATOR! Inverse feedback circuits allow 10 DB OF CLIPPING with negligible distortion.

NEW PS-2 AUDIO PHASE SHIFT NETWORK: A twelve cross-over point network is composed of heat-cycled components having .1% accuracy. Even changing the balanced modulator tubes has no effect on it's maintaining 50 DB OR BETTER suppression!

POWER OUTPUT: The husky, ultra-linear type 6550 tubes in the final of the 100V will deliver 100 WATTS OF SINGLE TONE POWER, EVEN ON TEN METERS! AND WITHOUT GRID CURRENT FLOW. Two tone third order distortion products are down in excess of 40 DB. A new POWER OUTPUT CONTROL eliminates the need for power dividers when driving AB1 or AB2 linears, since power output is continuously variable from 10 watts to full output.

SET AND FORGET CONTROLS: These seldom used controls are all located behind the flip down magnetic doors on the front.

GENERAL CIRCUITRY: Crystal controlled master SSB generation is at 8 MC. VFO injection is 5 to 6 MC. Crystal controlled heterodyne oscillators operate into mixer stages for various bands. This system, originally developed by C. E. is today the standard of the industry. Blocked grid keying of mixers and final amplifier provides perfect CW and PHONE BREAK-IN.

PHYSICAL DATA: Panel is standard 19" width by 8¾" high. Finish is smooth grey. Attractive heavy duty rounded corner cabinet is 15" deep, is finished in grey wrinkle and has a latch type access lid. Shipping weight approx. 90 lbs.

MULTIPHASE 100V complete..... ..... Amateur net.....$695.00

Orders entered prior to June 1, 1959 will be shipped at the original price of $595.00

COMING UP! MORE SUPERIOR GEAR FROM C. E. THE SSB PIONEER

A NEW COMPANION RECEIVER: Which will TRANSCEIVE THE 100V or separate the two VFO's at the flip of a switch. The 100V has the interlock control sockets built in.

A NEW 2500L BROADBAND LINEAR AMPLIFIER. Big brother to the famous 600L.

A NEW HETERODYNE CONVERTER: To cover all of the 2 and 6 meter bands with the 100V. Interlock control sockets are in the 100V. SORRY: INFORMATION AND DELIVERY DATES ON THESE NEW ITEMS NOT YET AVAILABLE. For further info, check No. 18 on page 126.

MULTIPHASE EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois

A subsidiary of Zenith Radio Corp.

WRITE FOR LITERATURE ON THE COMPLETE MULTIPHASE LINE

COMMAND YOUR BAND

with MOSLEY POWERMASTER

THE BIG-SIGNAL ANTENNA

Here's the full-size beam with full-size performance, for the ham who demands the best!

100% rust-proof . . . aluminum elements and boom . . . stainless steel hardware . . . high impact polystyrene insulators . . . all the finest . . . all built to last!

Each POWERMASTER is designed for a single band . . . 10, 15 or 20 meters . . . with low SWR over entire bandwidth.

For U.S.A. only

A-310 — 3 elements, 10M, rated 1KW.....$37.50
A-315 — 3 elements, 15M, rated 1KW.....$42.50
A-320 — 3 elements, 20M, rated 1KW.....$77.25

If your dealer can't supply the POWERMASTER you want, write to

If You're a "Tribander," Be Sure and See the Mosley TRAPMASTER Line

Mosley Electronics, Inc.

8622 St. Charles Rock Road
St. Louis 14, Mo.

For further information, check number 21 on page 126.

At Last . . . the Finest Low Cost Transmitter On the Market . . .

NEW Globe Chief Deluxe

75 WATT METER INDICATION FOR NOVICE USE • NEW 1300 MMFD VARIABLE LOADING CONDENSER • MODIFIED GRID BLOCK KEYING FOR MAXIMUM SAFETY (CATHODE KEYING WITH VFO) • PROVISION FOR PLATE OR SCREEN MODULATOR INPUT BY SIMPLE PLUG-IN • NO MODIFICATION NECESSARY TO ADD GLOBE VFO OR MODULATORS • BUILT-IN POWER SUPPLY • STANDARD COAXIAL ANTENNA FITTINGS • NO SHARP CABINET EDGES • COMPACT CONSTRUCTION • 3-COLOR DIAGRAMS SIMPLIFY KIT CONSTRUCTION

Styling

MODERN NEW "LOW LOOK" CABINETRY
ROLLED EDGES • ROTARY SWITCHING

SELF-CONTAINED 90-WATT TRANSMTTER FOR CW; BANDSWITCHING 10-80 METERS

Operation

IN WIRED FORM $79.95 STYLING

IN KIT FORM $59.95 OPERATION

The Globe Chief Deluxe truly lives up to its name! Gracefully styled with the new "low look" cabinet of pleasing proportions and a tastefully designed panel, its smart, modern appearance is second to none. Improved circuitry and new components provide outstanding performance for the advanced amateur or the novice. Appearance and performance add up to value that cannot be matched anywhere. Improvements include a new 1300 mmfd loading capacitor for continuous variable loading on all bands and for improved TVI and harmonic suppression, selectable keying (grid-block or cathode); all Globe Accessories such as VFO, screen or plate modulator may be plugged in without modifications; internal control for antenna relay; all switching functions performed by rotary switches — no unsightly or hard-to-use slide switches. Standard coaxial antenna fittings. This adds up to unsurpassed quality and value. Kit contains pre-punched chassis, all parts and tubes, and complete manual for easy assembly. Compact: 15¼x6¼x11¼". Shipping weight: 31 lbs.

Available

AFTER OCTOBER 1, 1959

See Your Nearest Dealer

GLOBE electronics
3417 W. BROADWAY
COUNCIL BLUFFS, IOWA

For further information, check number 20 on page 126.

Walking the Plank

That poor fellow being fed to the sharks was our advertising manager. Don't you agree that he deserves it?

Some time ago, he learned of plans for the advanced new Eldico EE-3A Electronic Key. When he realized how unique it would be, and that it would include every worthwhile operating advantage *plus* REL's world-famous reliability, he let his enthusiasm run away with him.

Without determining the amount of engineering required, he rashly announced the EE-3A when it was scarcely more than a gleam in the eye of our engineering department.

Lots of hams were enthusiastic, too, and orders poured in. Our project engineer, whose meticulous attention to detail makes him something of a legend—even at REL—is slaving to meet this demand at the earliest possible moment consistent with the most rigorous REL standards.

We don't yet know when our perfectionistic project engineer will approve the design. What we do know is that it'll be well worth waiting for! If you have ordered, or if you request to be notified, we'll be pleased to let you know when it's available

ELDICO

Radio Engineering Laboratories·Inc

Dept. C · 29-01 Borden Ave · Long Island City 1, NY

For further information, check number 60 on page 126.

NEW!
NEW!
NEW!

"6N2"

Thunderbolt Power Amplifier

1200 watts P.E.P.* input SSB and DSB,
1000 watts CW, 700 watts AM linear!
Bandswitching 6 and 2 meters!

*The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 1200 watts or more depending upon individual voice characteristics.

It's new! The Viking "6N2 Thunderbolt" Power Amplifier!

Rated at 1200 watts P.E.P. input SSB and DSB, Class AB_1; 1000 watts CW input, Class C; and 700 watts input AM linear, Class AB_1. Continuous bandswitched coverage on 6 and 2 meters – effectively TVI suppressed and filtered – wide range pi network output. Efficiency is outstanding – losses on 2 meters are held to approximately 5%, instead of common 25% losses experienced in some other 2 meter circuitry! This is possible due to the unique silver-plated Hi-Q coaxial line; silver-plated anode and other external metal portions of the 7034 tubes; silver-plated inductors; capacitors; and switch!

Final amplifier of the "6N2 Thunderbolt" employs two bridge neutralized RCA 7034 coaxial type tetrodes – kept cool by a self-contained high capacity blower system. Two meters permit constant visual check of operation – plate current meter also reads watts input . . . the second meter reads grid current, screen current, plate voltage, RF output voltage, and screen supply current. Completely self-contained in an attractive maroon and grey cabinet with high voltage power supply, internal blocking bias, voltage regulator, screen and bias supplies. Complete with tubes.

Drive requirements are approximately 5 watts in Class AB_1 linear, or 6 watts Class C continuous wave.

Cat. No. 240-362-1 Viking "6N2 Thunderbolt" Kit.....**Amateur Net** **$524.50**

Cat. No. 240-362-2 Viking "6N2 Thunderbolt", Wired and Tested.....**Amateur Net $589.50**

TUBE COMPLEMENT

(2) RCA 7034 Tetrode-Final Amplifiers
(2) 866AX High Voltage Rectifiers
(1) VR-75 Bias Regulator
(2) VR-105 and (1) VR-150 Screen Voltage Regulators
Selenium Bias Rectifier

For detailed specifications, write for Data Sheet 714.

E. F. JOHNSON COMPANY
2848 SECOND AVENUE S.W. • WASECA, MINNESOTA

For further information, check number 21 on page 126.

no matter what you expect from a transmitter...

VIKING "RANGER" TRANSMITTER

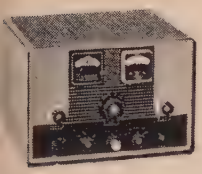
Effectively TVI suppressed and completely self-contained, the Viking "Ranger" transmitter/exciter is a complete phone and CW transmitter for 10 through 160 meters, and may also be used as a flexible exciter without modification.

As a transmitter, the "Ranger" is a rugged and compact 75 watt CW input or 65 watt phone unit. Pi-network coupling system will match antenna loads from 50 to 500 ohms and will tune out large amounts of reactance. Built-in VFO is extremely stable, temperature compensated—unit may also be operated by crystal control. Timed sequence (grid block) keying provides ideal "make" or "break" on your keyed signal, yet the "break-in" advantages of a keyed VFO are retained.

As an exciter, the "Ranger" will drive any of the popular kilowatt level tubes and will provide a high quality speech driver system for high powered modulators. Control functions for the high powered stage may be handled right at the exciter—no modification required to shift from transmitter to exciter operation. Complete with tubes, less crystals.

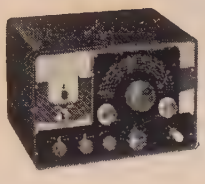
Cat. No. 240-161-1.....Kit..... Amateur Net $229.50
Cat. No. 240-161-2.....Wired..... Amateur Net $329.50

you'll get more with a Viking



"CHALLENGER" – 70 watts AM input 80 through 6, 120 watts CW input 80 thru 10 –85 watts on 6. With tubes.

Cat. No.		Amateur Net
240-182-1	Kit	$114.75
240-182-2	Wired	$154.75



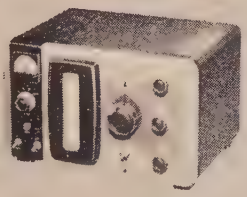
"NAVIGATOR" – 40 watts CW input – serves as a flexible VFO/Exciter. Built-in VFO. With tubes.

Cat. No.		Amateur Net
240-126-1	Kit	$149.50
240-126-2	Wired	$199.50

"VALIANT" – Instant bandswitching 160 through 10. 275 watts input CW and SSB (P.E.P. with aux. exciter) 200 watts phone. With tubes.

Cat. No.		Amateur Net
240-104-1	Kit	$349.50
240-104-2	Wired	$439.50

3 feature-packed amplifiers!



"COURIER" AMPLIFIER – Class "B" linear rated 500 watts P.E.P. input with aux. SSB exciter – 500 watts CW and 200 watts AM! Continuous coverage 3.5 to 30 mcs. Drive requirements: 5 to 35 watts. With tubes.

Cat. No.		Amateur Net
240-352-1	Kit	$244.50
240-352-2	Wired	$289.50

"THUNDERBOLT" AMPLIFIER – Rated 2000 watts P.E.P.* input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mcs. May be driven by "Ranger", or other unit of comparable output. With tubes.

Cat. No.		Amateur Net
240-353-1	Kit	$524.50
240-353-2	Wired	$589.50

"KILOWATT" AMPLIFIER – This exciting unit is the only power amplifier available which will deliver full 2000 watts SSB* input and 1000 watts CW and AM! Continuous coverage 3.5 to 30 mcs. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

Cat. No.		Amateur Net
240-1000	Wired and tested	$1595.00
251-101-1	Matching desk top, back and 3 drawer pedestal. FOB Corry, Pa.	$132.00

The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.

New Catalog

Yes, dollar-for-dollar and feature-for-feature you'll get more of everything in a Viking transmitter . . . that's why Viking transmitters outsell all others! Write for your free Viking Amateur Catalog and you'll soon see why your best transmitter buy is a Viking!

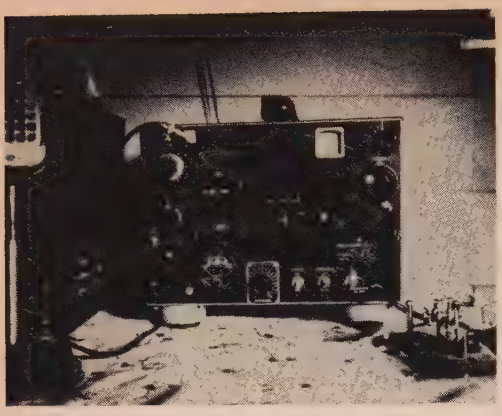
E. F. JOHNSON CO.

2916 SECOND AVENUE S. E. • WASECA, MINNESOTA

Viking

FIRST CHOICE AMONG THE NATION'S AMATEURS

For further information, check number 22 on page 126.



TCS CONVERSION

Berden O. Bretz, W7GQR
P.O. Box 203
Tonopah, Nevada

The TCS series equipment is made up of a transmitter covering the range 1.5 to 12 *mc* in three bands, with a very stable calibrated *vfo* built into the unit. The *rf* portion consists of a 12A6 *vfo* operating in the frequency range of 1.5 to 3.0 *mc*, a 12A6 crystal oscillator, a 12A6 buffer-doubler, and a pair of 1625's in the final. However, only one 1625 is operating during voice transmissions, with the other 1625 in parallel during cw operation. The audio system is a pair of 1625's in class B, with the secondary of the microphone transformer connected to the grids of the modulator tubes. The power output is 20 watts on phone and 40 watts on cw. The modifications described will enable the owner to change the rig from 20 watts to 150 watts phone and the resulting QSO's will more than compensate you for the time and money invested.

Simple Conversion

To use this rig as a fixed station with a high impedance microphone make the following changes in the circuit shown in fig. 1. Remove the crystal socket and the associated wiring right up to the switch; remove the microphone transformer; capacitors C-123, C-124, C-125, C-129 and resistors R-114, R-115, R-116, R-117, R-126, L-109. Replace resistor R-118, 330 ohm cathode bias resistor with a 250 ohm 10 watt resistor, R-119 Screen dropping resistor with a 35,000 ohm 10 watt resistor. Short the CW-Voice switch to ground the cathode of V-105 when in the phone position and also to apply filament voltage to this tube during phone operation, thus putting both 1625's to work at all times. To the oscillator selector switch, solder a wire to the blank MO test contact and route to terminal 3 on the power plug. Disconnect the lead between terminal 5 of the 12A6 that connects to the movable arm of the oscillator selector switch and ground the movable contact. This will turn on the 225 volt supply and apply 225 volts to the *vfo* for zero beating and when returned to the MO position will tie the low voltage supply to the relay in the power supply.

Build up the speech amplifier described in fig. 2 on an aluminum plate cut to the same size as the crystal sockets and mount it in the space vacated by the crystal sockets. Wire the microphone circuit as shown in fig. 3 and you will be able to use the jack for cw also. The audio gain control is mounted on the rear of the unit, but by rerouting the power plug to the rear of the cabinet, (no sweat) mounting the gain control on a dial plate and bolting into the hole left by the power plug removal, it goes on the front panel very nicely. Change the antenna connectors to coax type. The power supply is diagrammed in fig. 4, and will enable you to go on the air with about 60 watts of power. This is maximum with the modulation transformer used in this unit.

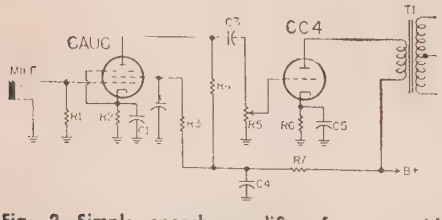


Fig. 2—Simple speech amplifier for use with crystal mike.

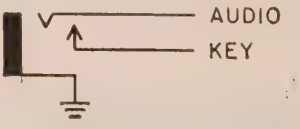


Fig. 3—Mike jack wiring for use with key or mike.

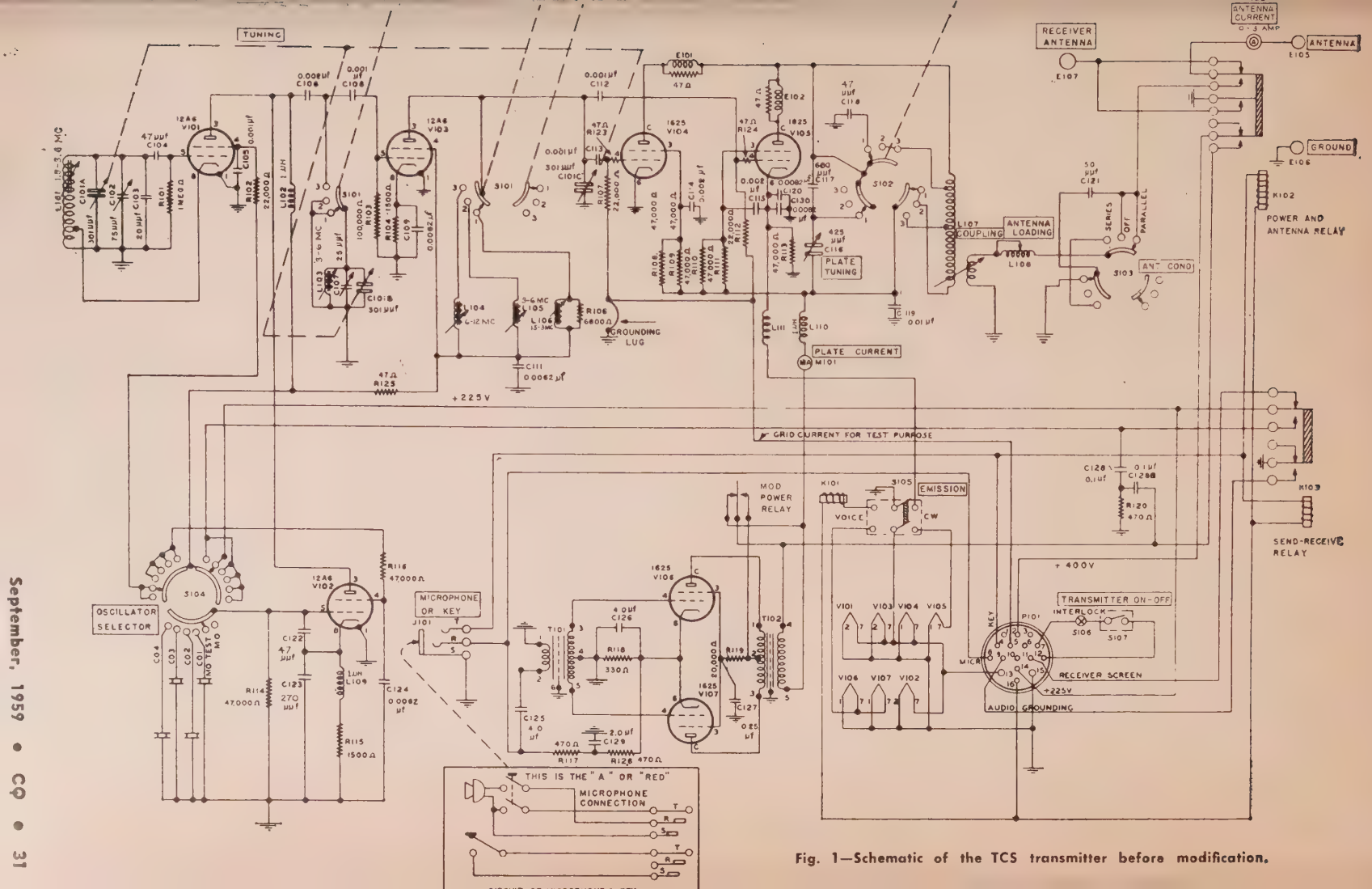


Fig. 1—Schematic of the TCS transmitter before modification.

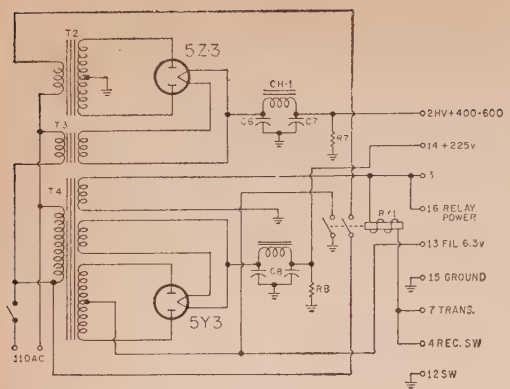


Fig. 4—Power supply for low power operation. Terminals 3 and 13 are reversed as shown above.

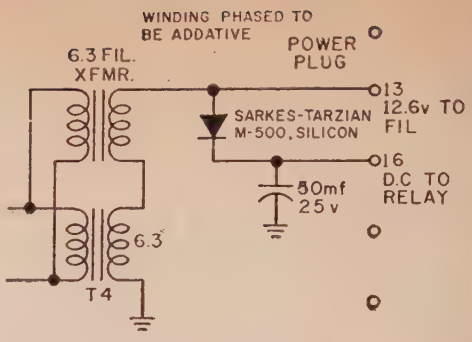


Fig. 5—Modification for operation with 12 volt tubes and dc relays.

Antenna and Tuning

The antenna system used with this setup is a length of coax just long enough to take you out of the shack, the center conductor connected to an antenna 135′ long from the antenna connector to end insulator (this includes the coax). The shield goes to a good ground. The tuning is simple. For 75-80 meter operation, set the MO switch to MO Test and tune the *vfo* until you have a zero beat in the receiver. Turn the switch back to the MO position. Set the antenna condenser switch to the parallel position, turn the antenna coupling control to 0 position, turn on the plate switch and dip the final. Turn the coupling control until you get a rise in plate current or an indication on the antenna current meter. Tune the antenna tuning control until the antenna meter reads a maximum, adjust the plate control for another maximum indicated on the antenna meter, adjust the coupling control for another maximum, adjust the plate control for another maximum and then repeat the process until you have reached absolute maximum. NOTE—We did not use the PA plate meter after the first dip, but used the antenna meter for an output indication, thus obtaining maximum output. Although this sounds like a long drawn out process, with practice you can be ready to answer a CQ before the other fellow is finished calling. A good level of modulation is indicated by an increase in antenna current, and I believe a 20% increase indicates 95% modulation. For 40 meter operation repeat the above steps except put the antenna condenser switch in the series position.

This unit may be operated on six volts by changing the 12A6's to 6V6's and making adapters for the 807 W's by removing the bulb from the 1625's and mounting 5 prong sockets in the bases remaining and connecting filament to filament and screen to screen, etc. Thus, no wiring change is necessary. The relays will have to be replaced with 6 volt units.

Examination of the power supply circuit will indicate that the filaments and relays are

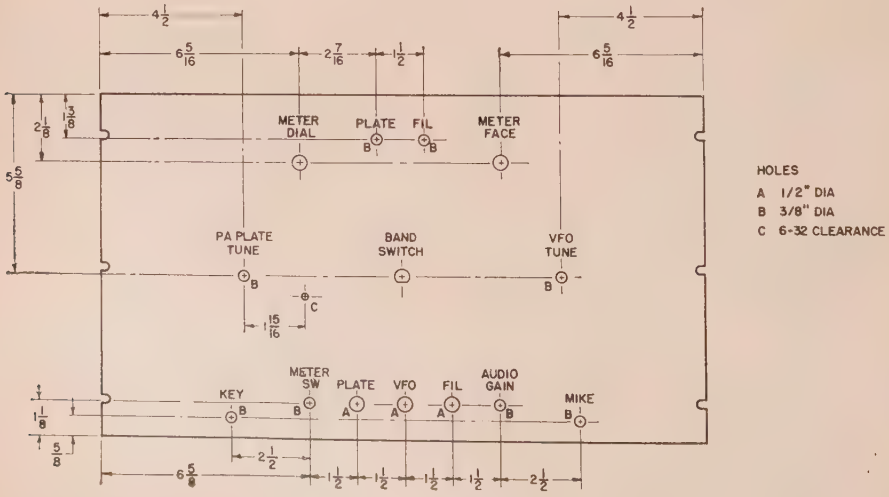


Fig. 6—Panel layout for 150 watt conversion.

perated from a 6.3 volt winding. To be able o do this, the 12A6's have to be changed to 6V6's and 807's, using adapters, have to be ubstituted for the 1625's. All the relays must e replaced with 6 volt AC units. To operate vith the original tubes, a 6.3 winding must be laced in series with the 6.3 winding of T4, roperly phased to be additive, thus providing 2.6 volts. Some of the TCS units were supplied with relays that would operate on AC or DC. If the unit you have requires DC for he relays, a simple supply such as shown in ig. 5 will be sufficient. Note it is now necessary o separate terminals 13 and 16 on the power lug.

Conversion to 150 Watt Fixed Station

The first step is to remove all the wiring nder the chassis, except the *vfo* and doubler iring. Remove all condensers, resistors and esistor boards, tube sockets in the modulator nd final, the microphone transformer, the nodulation transformer (it will break down nder the modulation used here), the antenna oils and capacitor, the coupling coil, and the elays. When you are finished the only area emaining intact is the *vfo* circuit and mountng. Remove the crystals socket and the switch nd all associated wiring but do not remove ie tube socket. We'll use this later for a ten nd twenty meter doubler-tripler. (Still experiental.) Remove the front panel and all conols, meters, etc., from it. Using this as a mplate, lay over and center on a 10½" by 9" relay rack panel and drill all the mountg holes used to bolt the panel to the cabinet nd drill all the holes to mount the band switch the original position. Next, using the drawing g. 6, drill the remaining holes and mount the vitches, dials and controls shown. The dial cutcheon for the *vfo* is made from an old eter case. Use bushings when mounting the al for the plate tank condenser knob and ount the gear on the shaft. Turn the cabinet er and cut, drill and mount the original ower plug, two feed thru insulators and a ax fitting to the back lip of the cabinet. eep them below a line of the louvers on the ist cover. (These louvers are cut out and plate cut to match the newly installed conctions in the rear of the cabinet.) Cut a nall piece of aluminum to fit across the space cated by the modulation transformer and e crystal sockets. Mount the sockets for the AU6 and 6AQ5 speech amplifier (fig. 7) to e right side allowing space for the bar across e cabinet. Mount a filter capacitor in back the 6AQ5, and mount the modulation transrmer on this unit. The modulation transrmer used here is a surplus ART-13 unit, t a Merit type A-3106 will also do very well. ire the speech amplifier as shown in fig. 7, owing sufficient lead length to connect to e microphone input jack and the audio conls on the front panel and the B-plus and

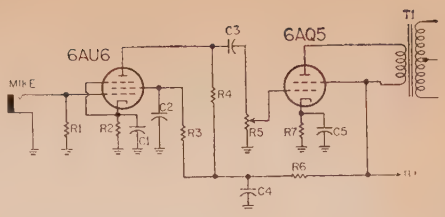


Fig. 7—Speech amplifier for 150 watt operation.

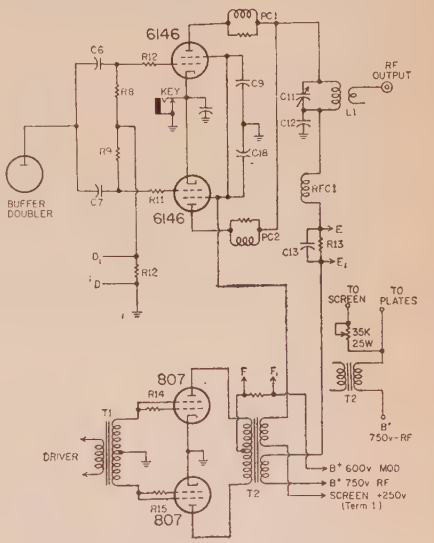


Fig. 8—Schematic of the modulator and final. Driver transformer T1 connects to the 6AQ5

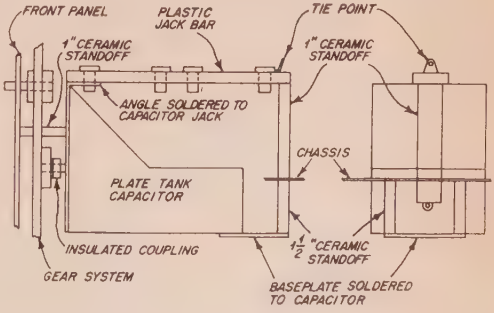
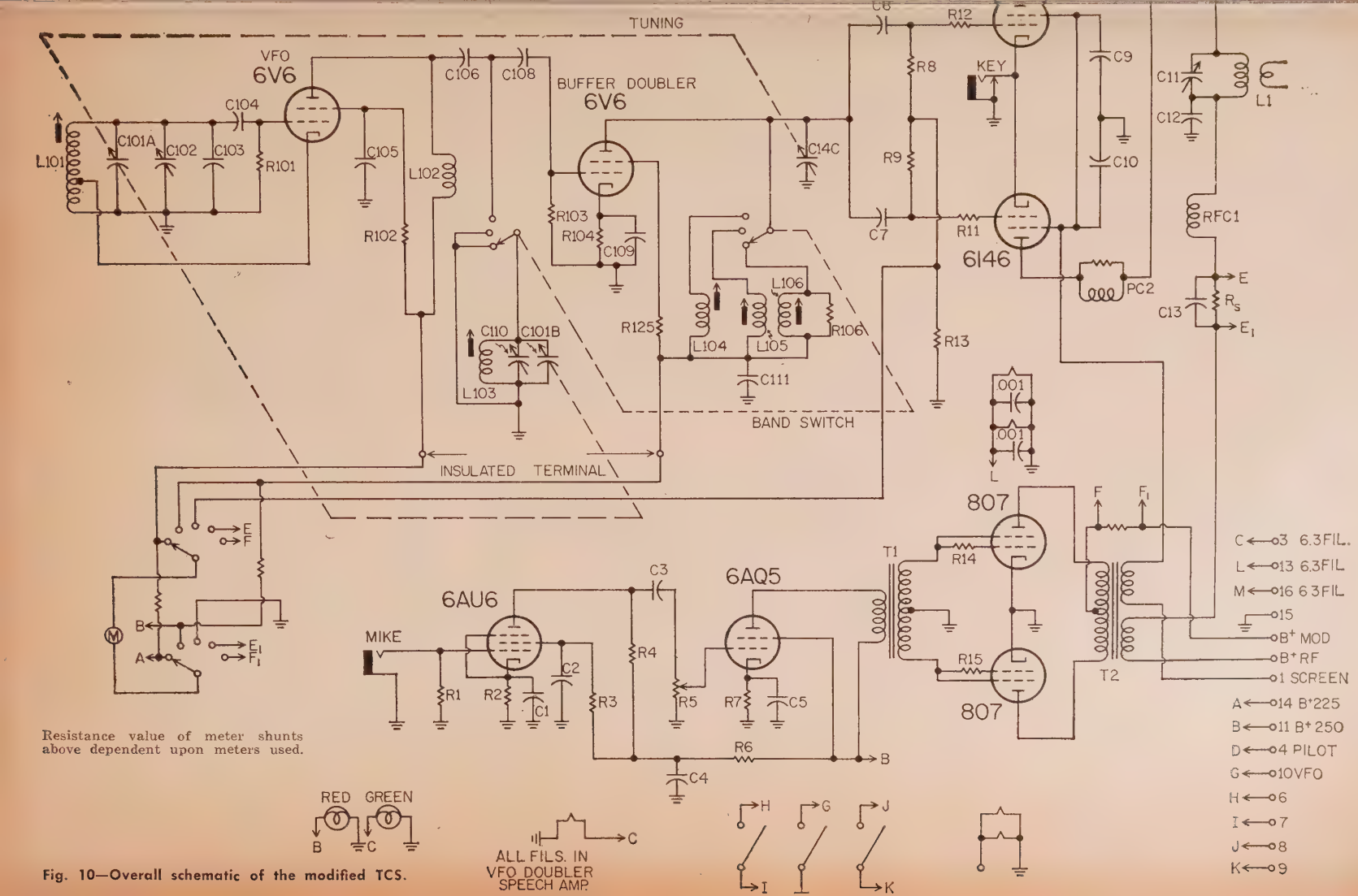


Fig. 9—Construction details for the Final Tank.

filament lines to the *vfo* terminals. Mount the driver transformer to the rear lip of the cabinet, just below the speech amplifier, and connect to the plate of the 6AQ5 and to the B-plus terminal. Ground the center tap of the secondary. After mounting two 5 prong sockets in the space originally occupied by the 1625 modulators, connect the remaining two leads from the driver transformer to the screen grids of the 807 modulators, as shown in fig. 8. The 807's in this circuit are used as class B zero triodes and work out very well, and no screen voltage to worry about. The audio system is now completed.



Resistance value of meter shunts above dependent upon meters used.

Fig. 10—Overall schematic of the modified TCS.

Mount two octal sockets for the 6146 tubes n the space left vacant by the 1625's in the *rf* ection. Build up the final tank section as nown in fig. 9, and mount one gear to the apacitor, being positively sure the metal part f the capacitor is thoroughly insulated from ne gear by a short insulated shaft. Mount this ssembly in the space occupied by the original ink circuit. From the terminal on top of the ew tank circuit run a short flexible lead to the arasitic suppressors and then to the plate caps f the 6146 tubes, soldering the suppressors irectly to the plate caps. Re-install the 2.5 mh -110 *rf* choke (removed earlier) and solder ne side to the capacitor frame. This choke is nounted in the same space it originally oc-upied. On the covering of the *vfo* frame (the orner nearest the rear of the tank capacitor) nount a ½" standoff insulator and tie the riginal 22,000 ohm resistors, R-107, R-112, o a terminal lug mounted on this standoff in-ulator. Also connect a length of green wire om here to the meter switch and a 100 ohm, ½ watt resistor from this terminal to ground. ne 47 ohm isolating resistor, R-123, is tied o the grid on the nearest 6146 and the other esistor, R-124, is tied to another ½" standoff nsulator mounted between the standoff insu-tors supporting the final tank capacitor. From ne standoff the resistor is then tied to the grid f the other 6146. Solder the bypass capacitors o the proper tube terminals and then ground hem to solder lugs mounted by the bolts that old the tube sockets in place. Solder in the lament leads, screen connections, and the key ne. Route the RG-58/U coax output lead om the jack bar to the side of the cabinet, ong the under side to the connector on the ear apron. Connect the wires to the power lug, using spaghetti on each lead. Connect ne high voltage line to the feed thru insulators nd cable them to the standoff insulator on the rst bypass condenser in the *vfo*. Drop the 225 gulated voltage wire, the 250 volt wire for ne doubler and speech amplifier, and pick up e microphone wire, the meter wires for the scillator and doubler, the lines to the audio in control and cable these lines to the first witch on the front panel, dropping the micro-hone line at the proper place. Drop each witch wire as you lace past them until you ach the meter switch. Route the modulator ate lines, the B-plus to the modulator and e modulated return lines along the edge of e *vfo* compartment to the hole cut for em in the speech amplifier chassis, and on o to the transformer terminals. Connect in e switches and jacks along the line and wire the meter switch. Connect a short lead from e meter switch to the *rf* plate choke. This ould complete the entire modification on e transmitter, as shown in fig. 10, and you ould have had about 24 hours of work to t a really neat and efficient rig that will give ou many FB QSO's and trouble free operation.

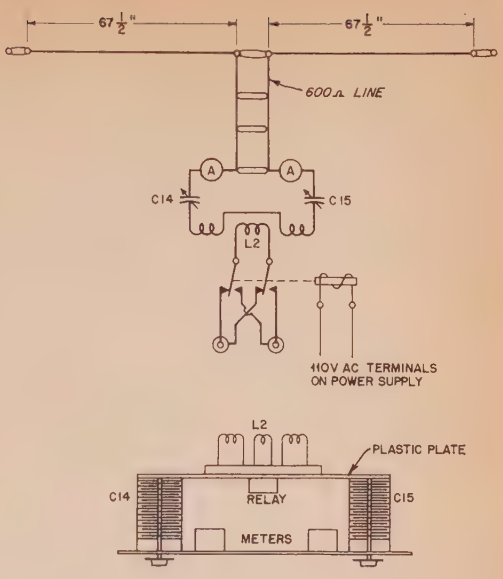


Fig. 11—Antenna tuning unit circuit and layout.

The final tank capacitors and capacitors used in the antenna tuning circuit, fig. 11, are removed from a BC-457-A transmitter, as are the gears used in the plate tank drive assembly. These gears will give the correct ratio for the 190 degree dial on the front panel to indicate correctly. The gear for the *vfo* was scrounged from the junk box and is about 2½ inches in diameter.

The power supply for the transmitter is diagrammed in fig. 12 and will deliver 750 volts at 250 *ma* for the final, 600 volts at 250 *ma* for the modulators, 300 volts at 150 *ma* for the *vfo*, doublers, and speech amplifier circuits. A terminal board mounted on the rear will

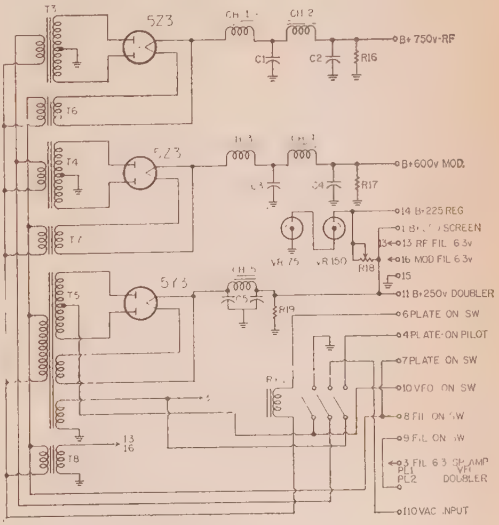


Fig. 12—Power supply schematic for 150 watt conversion.

allow the antenna relay to be powered when the plate switch is turned on and will also control a relay to make the receiver inoperative during periods of transmissions. No switches are mounted on the power supply as all controlling is done from the front panel of the transmitter.

To start the unit operating, throw the filament switch to the on position and this will apply 110 volts *ac* to the power supply input and to the primary of the filament transformers.

Tune Up

Allow about 30 minutes for the unit to reach operating temperature (*initial adjustment only*) and then turn on the *vfo* switch. This applies power to the *vfo* and doubler only. Set the *vfo* tuning dial to 3.0 *mc*, band 1 and adjust C-102 to exactly 3.0 *mc* (see fig. 13). Now rotate the tuning dial to 1.5 *mc* and adjust L-101 until the oscillator frequency is exactly 1.5 *mc*. Repeat 3 and 1.5 *mc* adjustments until no further adjustment is necessary to line up these frequencies and the *vfo* will now be accurate. Now set the *vfo* tuning dial to 1.5 *mc*, band 1, meter switch to *pa* grid and adjust L-106 for maximum grid current, about 4 to 7 *ma*. Set the *vfo* dial to 3.0 *mc*, band 2, and adjust L-105 for maximum grid drive, about the same as band 1. Set the *vfo* dial for 12 *mc*, band 3, and adjust C-107 for maximum grid drive. Set the *vfo* dial for 6 *mc*, band 3, and adjust L-103 and L-104 for a maximum grid drive. Repeat these last two steps until maximum grid drive is reached. The initial adjustment is now complete.

To tune the final set the *vfo* to operating frequency, set the antenna capacitor to minimum capacitance and the meter switch to *pa* plate. Turn on the plate switch to apply high voltage to the final and the modulators and quickly dip the final, which should read about 10 *ma* at resonance. Without further adjustment of the final, bring up the load by tuning each antenna capacitor a little at a time until you have reached about 200 *ma* plate current with both antenna capacitors approximately equal in capacity and the meters read the same. The antenna is now tuned to the transmitter. To further check the loading, remove the high voltage and disconnect the antenna at points "X" (fig. 11) and turn on the high power, the plate current should be down to the idling position without further adjustment of the plate tank circuit. With the antenna connected, if the plate current should exceed 200 *ma*, reduce it by pulling out the link in the antenna tuning coil.

A look at the antenna tuning network will show the receiver input to be tuned to the operating frequency by just tuning the antenna to the transmitter frequency. This results in about a 1 to 2 "S" unit increase in signal input to the receiver.

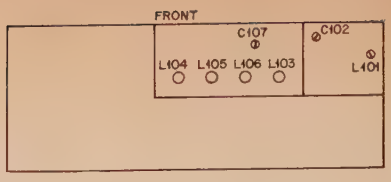


Fig. 13—Alignment point locations.

To check the modulation, set the met switch to the modulator plate position a whistle into the microphone. An increase plate current to about 110 *ma* should be not and the audio gain control should be set this figure to obtain approximately 95% mod lation.

Mobile Conversion Data

This modification should only take a fe minutes of your time. Replace resistor R-11 cathode bias resistor with a 250 ohm 10 wa resistor and R-119 screen dropping resist with a 35,000 ohm 20 watt resistor. Short o side of the CW-Voice switch to ground t cathode of V-105 and the other side of t switch to apply filament to the tube duri voice operation. Thus both 1625's are in oper tion during both voice and CW operation, a the output is about 40 watts. Short out or r move R-117 to increase the microphone vol age. These changes will noticeably increa your modulation level. Remove both antenn feed thru insulators and replace with coax f tings. The unit is now ready for 12 volt oper

[*Continued on page* 124]

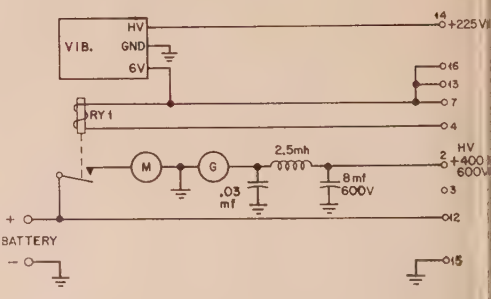


Fig. 14—Mobile power supply for TCS.

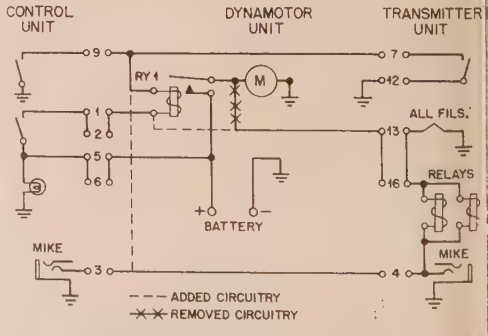


Fig. 15—Dynamotor rewiring to provide high voltage during transmissions only.

Monte Carlo Calling You!

William I. Orr, W6SAI/3A2AF

It was good to be back again! Sunny and I at on the broad, shaded porch of the Casino nd sipped an *aperitif*, idly admiring the pro- usion of flowers in the formal garden, pulsating vith colors in the brilliant sunlight. Little had hanged in the Principality since our first visit even years ago. Monaco was the same. The unlight was the same. The girl's skirts were horter, and best of all my Monagasque ham icense (3A2AF) was still valid. Yes, Monaco vas a good place to be, especially if you were nterested in. . . .

"Stop ogling the girls and get over to the ustoms house," admonished Sunny placing her *peritif* atop the glass table. "You will never get n the air if you don't have the equipment leared and passed by the custom officials."

"Ah, yes, the equipment," I thought. Soon A2AF would be a reality. All that stood in the vay was a formal waving of the hands, the igning of a bit of paper, the passage of an in- ignificant sum, and the wooden crate con- aining the carefully packed Hallicrafters HT-32 nd SX-101 would be mine. Out loud I said, Oui, ma Cherie! Allons au Douanier!" I tossed 500 franc bill at the waiter who picked it up ith a sneer, and we casually ambled down the graceful boulevard towards the waiting jaws of the Customs office.

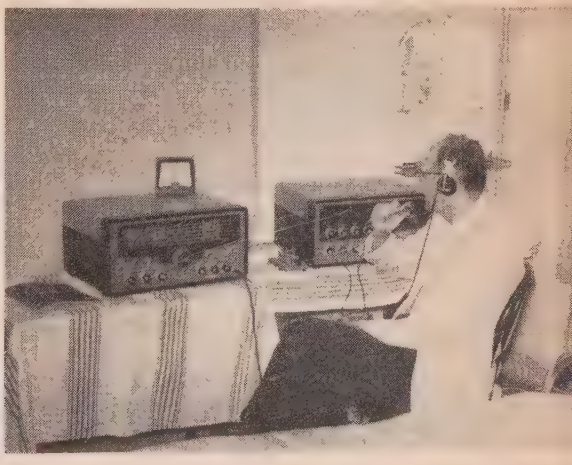
Le Douanier

The eyebrows of the French customs official could not have raised higher if he found I was trying to import a Whirling Dervish. He read the manifest slip several times in utter amazement and clucked his disbelief at the list of electronic equipment needed to make 3A2AF more than an imaginary figment.

Months before in sunny California I had planned the station of 3A2AF to the last detail. It must be capable of operation on sideband, a-m phone, and c-w with equal efficiency. It must run a fair amount of power to cope with the relatively poor radio location that was Monaco. It must be capable of operation from a non-too reliable voltage source that might wander between 105 and 130 volts. Most important of all, the equipment MUST be 100% reliable. No running to the corner radio store to replace a burned out *this* or an overloaded *that*.

The equipment chosen to fill these stringent requirements was the tried and true Hallicrafters HT-32 transmitter and SX-101 receiver. Use

Hotel le Siecle in La Condamine section of Monaco is headquarters for 3A2 DX-peditions. In spite of poor radio location, it boasts a flat roof and a sympathetic manager, two important requisites for the ham-visitor! Feeble, twisted antenna poles of 3A2AF can be dimly seen atop roof. In foreground is Monaco railway station.



3A2AF was installed in a small room on top floor of Hotel Le Siecle. SX-101 and HT-32 performed in tip-top fashion in spite of surging line voltages, and light lines made of #22 wire. Over 1600 contacts were made with trouble-free operation. Occasional lightning storms were occupational hazard while working DX.

of these items on other DX-peditions had proven their ability to "take it" when the going was tough. Other equipments were available that were perhaps smaller, or lighter, or less expensive, but none of them filled the bill for a period of extended, tough DX operation as did this particular choice. Acting upon this decision, Tom Stuart (WØREP/9), the Sales Promotion Manager at the Hallicrafters plant was contacted to see if the transmitter and receiver could be securely crated for overseas shipment from New York to Marseilles. Tom was immediately enthused about the use of sideband from such a relatively rare QTH, and he attacked the problem with vigor. In a short time the equipment was sealed in a waterproof wooden crate, mountains of red tape were met and overcome, and at last the life-blood of 3A2AF was safely stowed in the hold of a wallowing freighter bound for France. Tom's job was complete. It was now up to me to pry the equipment loose from the clutches of the frowning Customs officials.

"But, M'sieu, it is *impossible* to import radio equipment into France without written permission from Paris. And especially short wave transmitting equipment . . . Zut!" The Customs official rolled his eyes and looked upwards, as if expecting advice from the heavens.

Very carefully I explained in my best high-school French that although at this moment the radio equipment was sitting in *France*, its ultimate and final destination was *Monaco*, which, as everyone knows is a separate country. It would not be used in France, and the only reason that I was occupying the time and thoughts of M. Le Douanier was that the cargo ship did not unload cargo in Monaco. Therefore the equipment would be transported *through* France *to* Monaco, non?

An impasse was soon reached. I quickly reasoned it was time to call for reinforcements. The American Express agent who had aided and comforted me through the intracacies of this ordeal now leapt into the breach opened by my flagging morale. It developed, moreover, that the equipment could—under certain circumstances—be released in bond to me, perhaps upon the payment of a sum equal to the value of the equipment, the said sum to be returned to me when the equipment left France.

Very well. I sighed. I had passed the point of no return, so to speak. The equipment was at hand, literally begging to be put on the air. I glanced once again at the wooden crate sitting on the customs bench and reached for my wallet. . . .

A discone antenna atop the Hotel Le Siecle! 3A2AF was amazed to find this object perched atop the wall of the hotel. What was it for? Investigation revealed it was a chimney pot!

3A2AF (left) and 3A2BF (right) pose for a quick shot with 3A2AH's camera. Monaco hams are hampered by lack of equipment, TVI, and generally poor radio location. 3A2BF (Jean) has phone DXCC and is quite active on 14 mc.

Ramshackle thirty foot stick atop hotel supported one end of 3A2AF antenna. "Short path" to W-land lies through hills and apartments in the background. High fog coming in over mountain peaks makes "sunny Riviera" sometimes not so sunny!

Le QTH

Life was beautiful now. As I drove along the *Basse Corniche* towards Monaco, the crate of precious equipment safely stowed away in the rear of the Volkswagen bus I contemplated the future. I knew the housing situation in Monaco was grim: the small area of the country combined with a favorable tax situation had crowded the Principality until it bulged over into France. Indeed, the boundary between the two countries ran crazily down the middle of some streets, zig-zagging through yards and the middle of buildings. The immediate solution to this dilemma was to live in nearby Villefranche, and to install the radio station in a rented room in a small hotel near the Monaco railroad station. The *Hotel le Siecle* had been the haven of previous DX activity in the Principality, and the friendly manageress was fully acquainted with the pecularities of radio hams and their unusual desires. A fifth floor room was therefore rented for 3A2AF.

Hank (3A2AH) assisted me through some of the more trying moments connected with the transportation and assembly of the station. The HT-32 and SX-101 were carried boldly through the hotel entrance to the amazement of the resident guests, settled in the tiny 1890-vintage elevator and were soon in place in the operating room.

A final obstacle had yet to be overcome: the antenna. Obviously the builders of the hotel and the gentlemen of years-gone-by who laid out and planned the tiny Principality had no conception of amateur radio. The QTH was discouraging, to say the least. The "short path" to W-land was effectively blocked by a rocky range of 3000′ mountains (Alps-Martimes) bordering the north-west edge of Monaco. The tempting location at the top of the sheer cliffs was French territory. Noisy, high tension lines criss-crossed the Principality, and the hotel was surrounded by streets full of QRN-producing trucks and automobiles.

On the other hand, the "long path" to W6-land was obscured by the towering palace of their Serene Highnesses Prince Ranier III and Princess Grace. A close study, in fact, revealed the unpleasant news that the only clear directions were the path to Central America and Siberia, both areas notably void of concentrations of DX-minded amateurs.

The hotel itself "ran in the wrong direction," presenting a tempting space to erect antennas radiating to nowhere, and providing no anchor points for antennas erected to radiate in the wanted directions. Discarded antenna reminants of previous DX-peditions were in plentiful evidence. Scraps of copper wire, broken insulators, and chunks of coaxial line littered the roof. On a wooden post in the elevator housing were scratched and seared the calls of previous 3A2 DX-peditions. Abandoned in a corner were two long, thin poles, obviously used at one time to support a light dipole.

"These will have to do for my dipole until I can erect a good antenna," I said to myself.

Let's Listen In!

"What does the band sound like at a far-away DX location?" This is the popular question asked of any amateur who has operated outside W-land. Suppose we fire up the SX-101 and look over the bands. 80 meters is a sad situation, the high end being filled with broadcasting stations, and the remaining portion of the band heavily cluttered with fishing boats, radio teletypes, and point-to-point services. European amateurs have small slices of this band, and phone and c-w signals from the continent were plentiful during the evening hours. It is a tribute to the 80 meter DX men that they can work through the mad conglomeration of QRM on this band. Forty meters seemed in much the same state. The entire top end of the band (7,100 *kc* up) is devoted to broadcasting, with many smaller *b-c* stations appearing all the way down to 7.0 *mc*. Iron Curtain "jammers" patrol the band, North African broadcast stations chant unending songs in untelligible tongues, radio-teletypes ply their trade, and the poor radio amateurs are squeezed in the middle of this morass. Undoubtedly the situation will worsen as the sunspot cycle drops, and various services are forced to employ lower frequencies.

An interesting "long path" opening appears on 7 *mc* around 1300-1400 *G.M.T.* Sandwiched among all the bilge on the band, the west coast W6 and W7 stations may be heard and worked for a few hours by the European DX men. Dimiter, LZ1AF, told me one day that he had worked W6VSS on 7 *mc* in the afternoon, and wondered if Dale was a pirate in Europe, or a genuine W6. I assured him the contact was undoubtedly good, as Dale was very active on 7 *mc*, and had good antennas, and a good DX location. Unfortunately for 3A2AF, 7 *mc* operation was not permitted in Monaco, so pleas of "listen for me on forty meters" had to regretfully rejected.

The 14 *mc* band was by far the most active, and 3A2AF operation was confined mostly to this range of frequencies. Before 0600 *G.M.T.* the band was dead, coming to life abruptly around 0630, with strong signals from the U.S.A. Unfortunately, this opening was only about an hour long, and occured only two or three days each week. By 0745 the skip would extend past W-land into the Pacific, and for a short period of time VK and ZL stations were workable. By 0800 the band would be dead, except for "short skip" signals (DL, YU, UA, UB5, G, etc.). On many days the band would be completely devoid of signals from 0800 *G.M.T.* until noon. As the afternoon wore on, the band would gradually come to life with European signals, and around 1600 *G.M.T.* on rare days JA, KR6, and UAØ could be heard. Shortly after 1600 hours the "long path" to the western U.S.A. would abruptly open for about

45 minutes, and the band would be filled with my W6 and W7 friends on the Pacific coast. These distant signals were very good, with little flutter or echo.

In particular, sideband signals proved as effective as *cw* over this difficult path, leaving the *am* signals to come out a very poor second. Many local rag-chews between W6 and W7 SSB stations were heard when the operators thought the band was closed for DX. Some of them received quite a jolt when 3A2AF zeroed their frequency and they found themselves in QSO with a new country!

After 1800 hours, the "long path" gradually closed, to be replaced by South American, African, and Middle East signals, with a sprinkling of east coast W-stations. Because of the surrounding cliffs, the path to W9-WØ was especially poor, and relatively few mid-west stations could be heard, let alone worked.

During the early spring months a good short path opening to W-land developed on 21 *mc*, competing with a similar opening to the east (4X4-HZ-VU). Sideband stations on this band were not so numerous as on 14 *mc*, and were handicapped by 7 *mc* broadcast harmonics and Iron Curtain jammers that occupied large chunks of the band above 21.3 *mc*. Surprisingly enough, few African stations were heard or worked at 3A2AF, although I could hear others working them. The best period of African skip seemed to have occured during the dinner hour, as the usual ZS-VQ-ZE gang were conspicuous by their absence during the operating hours of 3A2AF.

Ten meters provided absolutely no openings to W-land, although other European stations could be heard working W-stations and handing out favorable signal reports. The shielding effect of the mountains was obviously at its worst on this band, as contacts with other parts of the world proved to be few and far between.

In any event, it could be seen that by properly choosing the time of day and concentrating on 14 *mc*, fairly reliable communication could be had a few days each week with the U.S.A. in spite of the towering cliffs only a few hundred feet away from the station.

Les Antennas

Problem: How to erect a good antenna atop the hotel without arousing the wrath of the hotel owner, and without creating a "scene" in the center of town? Poles could not be brought up the tiny elevator, nor could they be theaded up the narrow, winding staircase. And finally, where could antenna poles be found? Once again, 3A2AH came to the rescue, and four eighteen foot sticks (actually rough scaffold poles) were obtained from a local building supply house and spirited one early morning to the hotel. Hank affixed a long rope to a vent pipe on the hotel roof, and the poles were hauled up the side of the hotel, one at a time. With our hearts in our respective mouths we watched the poles gyrating about at the end of the rop narrowly missing neon signs and vario windows. At long last they reposed atop t roof. The battle was almost won—it was mere necessary to affix the poles to the parapet w of the roof by means of clamps and brackets

A Veil of Charity should be drawn over t next scene of 3A2AF in a smoky blacksmi shop, vainly waving his arms and drawing rou sketches on a scrap of dirty paper with an a most invisible pencil stub as he sought to e plain to the Gallic blacksmith the clamps a fixtures needed for the forthcoming anten project. Luckily, the blacksmith was a man fortitude and imagination and after a few fal starts the clamps and straps were made a placed in the limp hand of 3A2AF who ma his way back to the hotel and slumped in chair in front of the SX-101. "Los Angeles w never like this," he was heard to mutter.

A good night's sleep did much to restore t ego and boost the morale, and work was start on the antenna assembly. The 14 mc anten was erected first and proved an instant succe on the W6-long path.

"Your signals are RST 599 now with t new antenna," W6WWQ modestly told 3A2A on their first *c-w* contact.

"How loud is 599 on the meter of your r ceiver?" I asked him.

"About S3," he admitted after a short paus

"Well, that's the old DX effect at work," told myself. "The rarer the prefix, the loud the signal report. If I had an AC5 call, I'd forty decibels over S9, no doubt."

Even so, in spite of the solid zinc sheath roof of the hotel, the Alps in front of me, a the Royal Palace behind me it was possible work into W-land, providing many amateu with a new SSB country. To date about 16 SSB contacts in over 50 countries have be made, with over 1200 W-contacts in all c areas. The impossible had been done. A "rad hole" had been bored directly through t rocky, towering Alps leading to W-land

Le DX

Amateurs dreaming of working exotic D from an equally exotic QTH are fooling the selves, as 3A2AF soon found out. As far Monaco goes, the poor radio QTH is endow with large quantities of local QRN, coupl with great batches of QRM. Broadcast h monics, Russian jamming signals, radio te types, and clandestine propaganda statio (probably in Africa) clogged the bands. S7 S9-plus noise levels were the rule rather th the exception.

Worst of all, it proved to be a formidat task to work DX with a DX call. Time w limited in which to operate, so an attempt w made to keep contacts short and to work many station as possible. At the same time, t

[*Continued on page 120*]

Put Your Ranger On SSB Easy

Warren Binkley, K5GMN

Having had many enthusiastic comments and inquiries about this little rig at K5GMN, we came to the conclusion that the only thing to do was share its virtues with as many persons as possible who might have the yen to go SSB cheap, easy and GOOD. We are using a Viking Ranger with a Heathkit SB-10 with results that have equalled our fondest expectations. We have ample power to operate barefoot or drive anything you might wish to put behind it. The Ranger lends itself exceptionally well to SSB operation, being very simply modified to accept the Heathkit exciter with no changes whatever in the kit construction. The only disadvantage to the Ranger is *vfo* stability; there is a very slight warm up drift over a period of about 45 minutes. Thereafter the *rf* source is very stable. The excellent efficiency of the rig is preserved completely, and best of all for Ranger owners, this is not only a wonderful little rig, but it is so-o-o inexpensive.

The complete job consists of the following steps:

1. Construct SB-10 as per instructions.
2. Break *rf* output of driver stage of Ranger and use it to drive SB-10.
3. Reinsert output of SB-10 to grid of final in Ranger.
4. Place final of Ranger in linear operation (simple).
5. Construct external power supply for SB-10 operation.

Step No. 1 is self explanatory. Any ham of any kit experience and with a little knowledge can follow the directions and have the satisfaction of watching this thing work with a minimum of bugs.

Step No. 2 consists of unsoldering the lead of the blocking condenser C32 from the parasitic suppressor L8. The buffer shield CH6 is temporarily removed and a 5/8" steatite ceramic stand-off is placed over the screw protruding between C77 and L7. A solder lug is placed on the stand-off for ease of making connection to the output lead. A hole is drilled at any convenient adjacent spot and a ground lug affixed for grounding the braid of the coax.

External connections for bringing out the *rf*, grid bias control and feeding the SSB signal back into the rig are necessary. We used phonograph connectors because they were so easy to install and neat. There is room for coax connectors in the middle of the chassis though. Those of you who are fussy can use two coax connectors for *rf*, and a phono connector for grid bias control. We used phono connectors for all. A length of RG 62U or RG 58U coax is used to complete the driver output step, using the ceramic stand off as a tie point for the pigtail of C32 and the coax.

Step No. 3 consists of connecting a piece of RG 62U or 58U from another external connector back to the original attachment point of the grid drive to the 6146.

Step No. 4: Placing the final in linear condition consists of obtaining 216 volts regulated by the addition of two OB2 regulator tubes in series to the screen grid of the 6146. The wire from the screen dropping resistor R15 is disconnected. The voltage source of 300 volts to the OB2 tubes is very handy at connection #7 of SW4B. The OB2 regulators are mounted on a homemade angle bracket just in front of the 6146 on the oscillator shield. The resistor R35 serves as a load resistor to the VR tubes and when using the Ranger in the AM mode, the VR tubes are readily switched out of operation.

The second requirement for placing the 6146 in linear condition is obtaining a negative voltage of about 45 to 55 volts. This should have a simple means of adjusting the resting plate current to 22 *ma.* The bias rectifier V14 makes available about 150 volts. The resistor R54 is replaced with a value that will drop the voltage to 115 volts. The resistor R52 is replaced with a 5000 ohm pot that is conveniently mounted just in back of SW4 and beside bias rectifier V14. It should be placed on the back portion of the platform to allow the later installation of a wafer mode switch on the front panel, and it should be of the

[*Continued on page* 113]

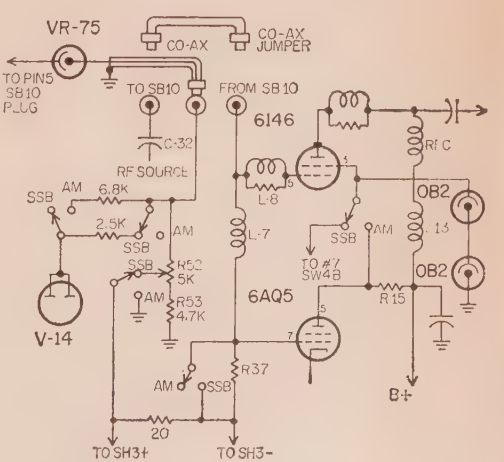


Fig. 1—Adaptation of the Ranger for operation with the Heath SB-10.

In The Beginning

F. D. Whitmore, W2AAA
223 W. Holly Ave.
Pitman, N. J.

Part VI

Between trips Hal's parents' house continued to be a beachcomber's rendezvous. Friends, beached operators, and the neighborhood youth, all delighted in hearing his latest adventures and experiences with the sea. And Hal had many tales to tell.

Generally his mother heard the tales too. She never joined the groups; but buzzing about fixing little "treats" for the gang, she kept pretty well within earshot. The milder stories like swimming in Jamaica harbor until warned there were sharks, or getting shocked when his long legs touched the whirling rotary under the operating table, never excited an audible sound from her. Neither did the one about nearly upsetting when, after unloading ballast, a sudden wind struck the tanker.

But you knew she listened because occasionally you heard glasses bang or a plate drop whenever Hal reated a particularly dangerous incident in a yarn. Two of the stories that unsteadied her hand most, concerned the lightning bolt that struck the *SS El Rio,* and the three-foot corona surrounding the *SS Toledo's* lead-in while carrying a cargo of gasoline.

Sailing in 1914 found all crews crazy for news. England was in the war and everyone wanted to know what was going on. Hal's ship at the time was a Southern-Pacific freighter sailing coastwise.

At 5:00 A.M. one morning following a severe lightning storm. Hal sat copying press news from Tampa as the *SS El Rio* ploughed through rough waters in the Gulf of Mexico. For no reason at all, a pencil lay across the four-inch blades of the double-pole-double-throw antenna switch.

In the midst of receiving, Hal suddeny found himself on the floor beside his overturned chair. Smoke poured from the receiver. Scattered on the floor about him were splinters of wood none larger than a toothpick. These fragments were all that remained of the pencil formerly resting across the blades of the antenna switch.

An immediate inspection showed the ship's only damage was a broken water pipe deep down in her hold. Hal wasn't hurt either. The one shoulder that rested against a brass pipe behind his chair when he received was a little sore; but there was no burn.

Hal's other perilous adventure occurred while sailing on a tanker. A legal battle between two of the wireless companies forced the Marconi company to revert temporarily to a fixed spark gap. To do this they improvised from the existing nonsynchronous rotary. Their inspector made the changeover.

The next night while gliding along with their cargo of gasoline, Hal fired up the rig to send a message. In the midst of his sending, the first mate rushed in all excited. He couldn't tell Hal what was wrong only that it was awful. His face was deathly white and he trembled all over. He feared the ship would explode.

His fright came from seeing a purple glow three feet in diameter around the lead-in every time Hal pressed the key. Apparently, keeping the rotary stationary and operating as a fixed spark gap, increased the voltage tremendously. The spectacular sight scared Hal too. He lost no time converting back to rotary operation.

Navy's "Old Faithful"—NAA

Shortly after Hal became a commercial wireless operator, the United States Navy commissioned its famous wireless station NAA. It was one of the great experimental stations of early radio history. Construction started about 1910, and approximately three years passed before commissioning exercises took place at the Arlington, Virginia site February 1913.

NAA was a beacon to amateur and commercial operators alike. Her powerful rotary spark and later arc equipment flung signals from the three self-supporting steel masts to Panama, Hawaii and other American outposts.

One of the masts reached skyward 600 feet, the other two were 450 feet. When only one wire stretched from the tallest mast to the

ground, listeners could hear signals from the Eiffel tower in Paris. In 1916 the first trans-Atlantic radiotelephone conversation in history occurred between Radio Arlington and the Eiffel tower in Paris. In 1916 the first trans-Atlantic radio conversation in history occurred between Radio Arlington and the Eiffel tower. Later in the same year, NAA succeeded in working Honolulu on phone.

For years this station broadcast marine weather reports at 10:00 A.M. and again at night. Thousands of ships' officers checked their chronometers by its daily midday time-ticks. When in July 1956 the Navy decommissioned NAA, older operators felt a close friend had passed away.

The United States Licensing Act of August 13, 1912 cleared amateur activity out of Government and commercial wavelengths by plunging them to the unheard of depths of 200 meters. After the first shock passed, experimenting amateurs discovered that their communication range was greater with no increase in power. Instead of being hurt by the change, the move was all to their good.

With this discovery, amateur antennas quickly became lower and shorter; less wire went into helixes; fewer plates took care of the condensers. Descriptions of 200 meter wireless stations soon appeared in current scientific periodicals. These were fine precise articles because amateurs now had to keep on their wavelength. Treatment of oscillatory parts gave exact details of size and spacing. Comparisons discussed the merits of helixes with those of oscillation transformers; of spiral windings to pancake construction; even wavemeters were covered. An amateur had no excuse for being off his wavelength. Do you remember the specifications for 200 meter gear?

Helix — Ten inches in diameter, #4 wire, seven turns spaced three-quarters of an inch apart.

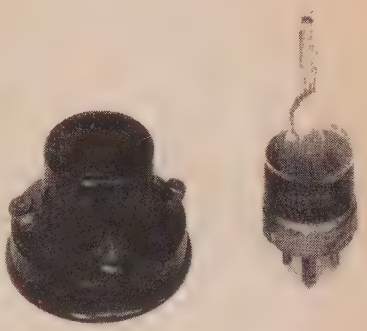
Oscillation transformer—Primary ten inches in diameter with four turns of #4 wire spaced three-quarters of an inch. Secondary coil not critical to wavelength; coil should have a smaller diameter than the primary and contain more turns closer spaced. The construction of the form should permit the coupling to be varied.

Oscillating circuit capacity—

Spark gap Size in inches	*Capacity in microfarads*
1	.004
2	.008
3	.012
4	.016

Antenna—Total length of the antenna consisting of four wires spread two feet apart shouldn't be over 120 feet long from its far end to ground. An antenna 35 feet above the transmitter which in turn is 10 feet above ground

The days when there were no licenses. O. V. Swisher and his Freemont, West Virginia 1911 rig. Outfit consisted of two slider tuner, a sliding plate condenser, electrolytic detector, electrolytic interrupter, and 2 inch spark coil.



WD-11 receiving tube and socket; designed to operate from dry cells. It was more suitable for stationary setups.

Early deForest three element receiving vacuum tube.

shouldn't be over 75 feet long. The sum of the antenna length, lead-in and ground wire should not exceed a total of 120 feet.

Amateur Radio Relay League

In May of 1914 something started that greatly interested wireless enthusiasts at the time and shortly became the heart of amateur radio—the Radio Club of Hartford organized the American Radio Relay League.

The League aimed to establish dependable wireless communication between far distant points through cooperation of wireless operators throughout the country. This was a unique ambition. Only commercial companies and the Government could reliably transmit intelligence over great distances.

First attempts sought communication links between Boston and Denver. Later efforts endeavored to link New York with the Mexican border via Washington.

To kick the plan off, the League requested owners of wireless stations, having a transmitting range not less than thirty miles, to communicate with their secretary, Clarence D. Tuska. They hoped that all operators sincerely interested in the development of wireless telegraphy would join in this worthy pioneering project.

Operators immediately showed great interest for the League. Within a few months over two hundred officially oppointed relay stations stood ready for Hiram Percy Maxim, Chairman of the League, to start some tests. Ability varied in the group; some could receive 35WPM.

November 1914 saw the relaying organization completed. The League prepared a list of stations for distribution. This listing gave: names, addresses, calls, sending range and power, spark tone, usual listening hours, copying speed, whether station had a telephone for message delivery, and class of license. The list included most of the best stations. To get the list of stations, the League charged fifty cents. Included also was a pad of official relay message blanks, and a map of the United States including Upper Mexico and Lower Canada. The map contained all the relay stations.

WD-12 receiving tube; designed for operation from dry cells at stationary locations.

Struggling determinedly, the League founders contributed both time and personal funds to make their creation successful. Much pleading went into the circulars and bulletins to get the stations to purchase station lists and other offerings. Eventually, finances strengthened; and nineteen months after its founding, the League published the first QST. The date of this famous issue—December 1915.

The Prolific Teen Years

Amateur radio blossomed forth during the teen years. Several basic features contributed to this growth: Segregation from the "commercials," organization of their group, and gleaning the good points from the rapidly changing commercial trends.

Confinement of the amateurs to 200 meters congregated their activity in one spot. No longer did they disturb as much ether as possible in the hope of snaring a contact; now everybody knew where everybody else was.

The Licensing Act forced them to maintain this wavelength. Only in special cases under special licenses were some inland hams privileged to operate on 425 meters.

Instead of being detrimental to their pleasure, this constriction boomed amateur activity. Experience soon showed interference from each other wasn't prohibitive. QRM depended on the range of the spark sets; and this range was not very great. Amateur spark coils were good for about 25 miles. Efficient rotaries later extended the dependable distance to 100 miles or slightly more.

Crashing static still presented the worst interference. Before the 1912 regulation, broad rough spark notes competed with static for the listener's ear. Listening to the intermingled mess a straining listener sometimes declared the distant operator was keying static. Best operating periods occurred during the winter months; static was less severe generally, and, in some areas, nonexistent then.

Confined to a fixed wavelength along with increased knowledge of wireless, signals got sharper. As they got sharper, ranges of rigs increased. Finally as rotaries became the style in amateur shacks, high-pitched notes flashed to distances of 500 and 1000 miles.

Organization of the amateurs in the Amateur Radio Relay League developed regular listening periods for relaying stations and eventually had messages flitting back and forth across the country. From several days for a transcontinental

[*Continued on page 111*]

Multi-Band Vertical

No Traps—No Radials

Dr. R. G. Minarik, W9GJY
858 Emily Street
Menasha, Wisconsin

For almost 7 years I had an unused Sprague "Koolohm" 390-ohm, 100-watt non-inductive resistor on the shelf ready for the T2FD antenna which I never got around to building. Some day—. About a year ago my Nordic friend Eric (W9SOA) nearly wore a slot through the roof of his garage as a result of the innumerable trips he made trying to tame his home-brew 15-meter beam consisting of phased folded dipoles. It occurred to him that he only had another 40 or so years to live—so he bought a commercial tri-band job.

The day had arrived! I "borrowed" one of the folded dipoles, dusted off the resistor and voila!—a multi-band T2FD veritcal with no traps, no radials and almost no work, since W9SOA did a very creditable job in fabricating the folded dipole.

The illustration shows what resulted after the hairpins were pulled out as far as they would go. They were not quite long enough to make the over-all length 23.5 feet as specified by Countryman's formula. One would think that Eric could have been more considerate and anticipated this when he was building his beam.

We mounted the very rigid T2FD on an 18-foot 2x2 and lashed the unit to the side of my shack. I then spent about an hour with the SWR bridge finding out where to set the dials on the Matchbox. Rather surprisingly, the "Min-Eric" vertical (I thought this identification was a fine acknowledgment of co-operative effort, but friend Eric unappreciatively protested that it sounded exactly like my last name; confidentially, it does—exactly!) could be loaded not only on 10, 15 and 20 as intended, but on 40 and 80 as well. The SWR was so low that a 200 microamp meter could be zeroed on all phone and cw bands.

Now it remained to find out if all the RF was going into the resistor, as a dummy load, or if the thing really radiated. The BW 5100B was fired up and during a few morning hours before breakfasts last April, the following happened on cw:

10 meters—589 Hawaii; 579 Germany; 599 Mexico; 589 Puerto Rico

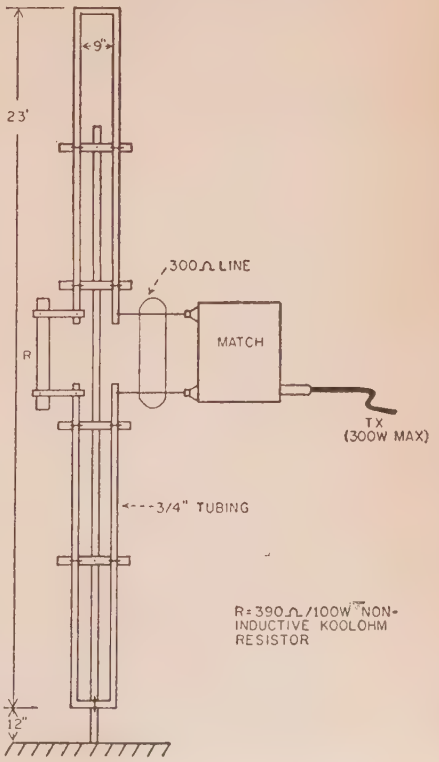
15 meters—589 Florida and California; 569 Australia; 579 Russia

20 meters—589 Hawaii; 569 New Zealand; 579 Haiti; 579 Australia; 459 Japan

40 meters—569 Ohio and Missouri; 459 California

80 meters—Bent the needle on Eric's new NC 300 (seven miles away). The sorehead!

Results with the vertical on 40 and 80 are not phenomenal—the radiation angle is too high and it's not even supposed to load on these bands. However, it takes all the power the BW can put out and does well on local contacts. On the other bands, it does better than anything that's been used here short of a beam. ■



SOME ABC's OF AMPLIFIERS

Carl C. Drumeller, W5EHC
5824 N.W. 58th
Oklahoma City 12, Okla.

Ask the average radio amateur or above-average electronic technician to define a Class A, a Class B, and a Class C vacuum-tube amplifier stage and note his answer. In all probability it'll be this: "A Class A stage is one in which the tube is biased to the straight part of its E_c I_b curve; it doesn't draw grid current." "A Class B stage is one in which the tube is biased to cut-off; it draws some grid current." "A Class C stage is one in which the tube is biased to twice cut-off; it draws heavy grid current." Nothing wrong with this . . . as far as it goes. Press him further, and you may pry out a few more facts. For instance, that a Class A stage often is used as a voltage amplifier; that, in rf, a Class B stage can be used to amplify amplitude-modulated signals; that a Class C stage can be plate-modulated. Still correct, but still missing the point. All these things are either examples of what these three classes of amplifiers can do or examples of the manipulations of stage parameters made in an effort to attain the desired status of operation.

Let's pause a moment and note the actual definitions of these classes of operation:

Class A: An amplifier stage in which the output waveform is identical to the input waveform.

Class B: An amplifier in which the power output varies as the square of the input voltage.

Class C: An amplifier in which the plate current rises in exact proportion to an increase in plate voltage.

With these definitions in mind, let's take them one by one and examine their capabilities and their limitations. For the sake of simplification, we shall confine ourselves entirely to radio-frequency applications.

Class A stages have been treated with such thoroughness by the technical press that little needs be said about them. Just keep in mind that their *rf* applications are determined by the same limitations and capabilities as their *af* applications. Then all you need to do is to read any of the many articles written for audiophiles.

Class B stages are quite another matter. Not too much factual information on this is available unless one digs it out, piecemeal, from a number of engineering manuals. First, let's ask ourselves why should a person desire a stage in which the power output varied with the square of the input voltage? Is the Class B stage something painstakingly designed to perform some desired function? The answer is an emphatic "Yes." The true Class B *rf* stage was designed with one thought in mind: To produce an efficient (relatively-speaking) stage capable of amplifying an amplitude-modulated signal.

Being a vacuum tube, the stage's *rf* power generator primarily is a voltage-operated device; therefore, one approaches the design problem with the consideration of having a voltage available to actuate the tube's grid. The amplitude of this voltage varies in accordance with the signal intelligence superimposed on the original carrier wave. Now let's start to nail down some of the things we must have in order to enable the stage to operate in the manner to satisfy our rigorous stipulated requirements. *Number one:* All voltages associated with the control grid must be of a "stiff" nature; that is, the voltages must not fall off if they are required to deliver power (sustain a current flow). Note that this requirement applies equally to both signal and bias voltages. Remember that the tube is biased (by an external voltage or by the tube's internal geometry design) to a condition approaching cut-off. Thus when signal voltage is applied, the plate current will increase. Let's mark down *number two:* The voltages associated with the plate (also the screen-grid and the suppressor grid, where applicable) *dc* supply must be of a "stiff" nature.

We have seen that the plate *current* increases when a signal voltage is applied to the control grid. We need, however, an increase in plate *power* . . . an increase related to the square of the grid voltage increase. Furthermore, this *rf power* must be developed from a constant-voltage plate power *dc* source. That leaves us with but two variables in the plate circuit (assuming "tank" losses to remain constant): The plate current and the vacuum tube "conversion efficiency." That latter term refers to the tube's ability to convert *dc* plate power input into *rf*

plate power output. Happily, these two variables can be made to complement one another in such a manner as to achieve the desired results. Very roughly, it is somewhat like this: The tube functions as a very inefficient dc power converter at low *rf* grid voltages, and plate *rf* current variations are small, too; at high *rf* grid voltage the tube's conversion efficiency increases, and its plate *rf* current variations are large. By extremely careful adjustment of bias, *rf* grid excitation (which must be light), and plate loading (very heavy plate loading is required), a condition can be achieved in which the plate rf power output varies with the square of the control-grid *rf* voltage input.

Note that these three variables (bias, excitation, and loading) are all interdependent one upon another. In other words, when you adjust a Class B stage, you are solving a problem with three variables! Small wonder that so few are adjusted correctly, for unless you have rather extensive (and decidedly expensive) test equipment, you do not have an "answer book" to tell you when you have reached the correct solution.

Class C stages have been treated rather thoroughly in the technical literature. Much of the material, however, deals with telling *how* to adjust a stage, rather than *why*. Let's go back to the definition: Plate current varies directly with plate voltage. This, again, suggests that some very definite applications were in mind when such requirements were stipulated. Such is the case; this is the condition that permits plate modulation.

A review of some of the operational requirements is in order. Briefly, they are these:

1. High control-grid bias, preferable cut-off bias from a fixed source and additional bias to at least twice cut-off from "grid-leak" bias.
2. Sufficient rf excitation to drive the tube well into plate saturation.
3. A "stiff" plate dc power source.
4. A vacuum tube with very ample cathode emission (not a small tube worked to the limits of its capabilities).
5. Relatively-light plate loading.

Why? A good reason in each case. The bias stipulated permits the tube to work at high efficiency and to adjust its bias instantaneously to varying requirements necessitated by the rapid variations of plate source voltage. The ppallingly-high *rf* excitation requirement is necessitated by exactly the same conditions: efficiency and varying plate source voltage. It s quite obvious that to sustain undiminished output, more grid drive is required for high plate source voltage than for low. As the plate power source will have to supply twice its "resting" current at its peak demands, it'll have to be esigned to supply such current without a drop n voltage. The ample cathode-emission and the light plate loading go hand-in-hand. The tube must be capable of supplying *four* times its normal (or "resting") rf power on peaks. It must not be anywhere near overworked under carrier-only conditions; otherwise, it'll never meet the peak load requirements.

Now, *why* this "four times power" stipulation? Why must the plate current increase in exact pace with plate voltage? Let's consider the classical case. Assume a final amplifier with 1000 volts on its plate; have it draw 0.1 ampere under normal (light) loading. Now, in series with the *dc* power supply, place an alternator of 707 rms (1000 peak) volts output. With the alternator inactive, the stage will draw 100 watts input. Assume 60% efficiency; then there will be 60 watts *rf* power output . . . all pure carrier. Let's start the alternator and consider it as it generates a quarter-cycle (positive-going on initial half-cycle) of voltage. The total plate source voltage on the tube will rise from 1000 to 2000 volts. If the other requirements have been met, the plate current will rise from 0.1 to 0.2 amperes. Thus the total plate power input will have risen from 100 watts to 400 watts.

The reader is referred to any of the many texts which explain in detail the division of this power into carrier and sidebands, and which portion is supplied by the modulator (alternator) and which by the dc power supply. Briefly, averaged over a full cycle of a sine-wave the alternator will have to supply 50% as much power as the *dc* power supply. This adds up to 150 watts average input; at 60% efficiency, 90 watts output, of which 60 watts remains pure carrier and 30 watts constitute "sidebands." This meets the requirements for 100% modulation by a sine-wave.

If for any reason all the stipulated requirements are not met . . . if the *rf* drive is low, if the regulation of the plate power supply is poor, etc., the envelope of the output rf power will not follow the modulating sine-wave but will be "flat-topped."

It can be shown that any departure from a sine-wave can be represented by a sine-wave plus harmonics. "Flat-topping," being a process of distorting a sine-wave, produces harmonics of the modulating frequency, a practice that calls upon its perpetrator the wrath of both the FCC and his fellow-amateurs. These latter two paragraphs are addressed to those misguided souls who reduce rf drive to plate-modulated finals in order to reduce the generation of rf harmonics . . . and thereby generate a beautiful crop of non-filterable af harmonics that splatter across a whole band.

To sum it all up in a few words: An amplifier is not a Class A stage unless its output waveform is identical to its input waveform. It is not a Class B stage unless its *rf* power output varies with the square of the *rf* grid voltage. It is not Class C unless the plate current varies directly with the plate voltage. Forget about definitions involving bias, drive, and loading; they are but tools to reach an end. ■

11,133 More FCC Violations

Maurice J. Hindin, W6EUV
6505 Wilshire Blvd.
Los Angeles, Calif.

In the October, 1958 issue of CQ, an article was published which called attention to the fact that during a four year period commencing July 1, 1952 and ending June 30, 1956, a total of 9,641 amateur violations were observed and reported by the Federal Communications Commission.[1] According to figures just secured from the FCC, 11,133 more violation citations were issued to amateurs in the two year period commencing July 1, 1956 and ending June 30, 1958. This represents an increase of 152 percent over the corresponding preceding two year period.

An analysis of the figures released by the FCC showed that during the fiscal year commencing July 1, 1956 and ending June 30, 1957, 5,268 violation notices were issued. For the fiscal year commencing July 1, 1957 and ending June 30, 1958, another 5,865 violation notices were issued.

The Federal Communications Commission violation notices fall into three main categories. The first category is Form 790, which is an advisory notice of an unsatisfactory operating condition. This form of notice is used to advise amateurs of objectionable operating practices, illegal harmonic radiation, key clicks, objectionable notes, etc. The second category is Form 792-A. This is an out-of-band notice. The third category is Form 793. This is a general citation form to notify the amateur of non-compliance with any of the rules and regulations except out-of-band operation.

An analysis of the citations issued during the fiscal year commencing July 1, 1956 and ending June 30, 1957 by forms issued is as follows:

Form 790	3,264
Form 792-A	85
Form 793	1,919

An analysis of the violations reported during the fiscal year July 1, 1957 to June 30, 1958 by form is as follows:

Form 790	3,718
Form 792-A	144
Form 793	2,003

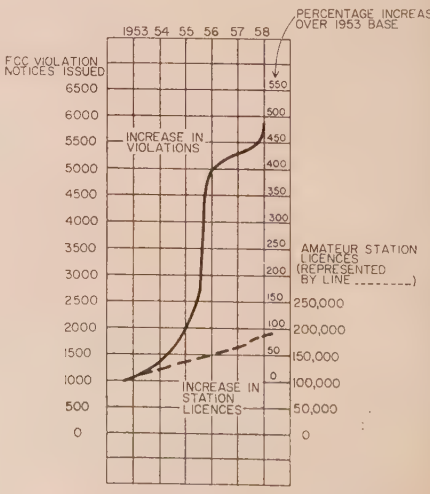
The totals by form for the two year period are as follows:

Form 790	Total	6,982
Form 792-A	Total	229
Form 793	Total	3,922
	Grand Total	11,133

As was previously reported, during the two year period between July 1, 1954 and June 30, 1956, a total of 7,306 citations were issued by the FCC. Compared with the 11,133 citations issued for the same two year period between July 1, 1956 and June 30, 1958, this represents an increase of 152 percent in violations, using the 1954 to 1956 period as a base.

The alarming increase in amateur violations observed cannot be satisfactorily explained on the basis of the general increase in amateur licensees. As of June 30, 1956 the FCC reported that there were 150,549 licensed amateur stations. As of June 30, 1957, the number of licensed amateur stations had increased to 160,000. As of June 30, 1958 the number of licensed amateur stations had increased to 179,314. The number of licensed

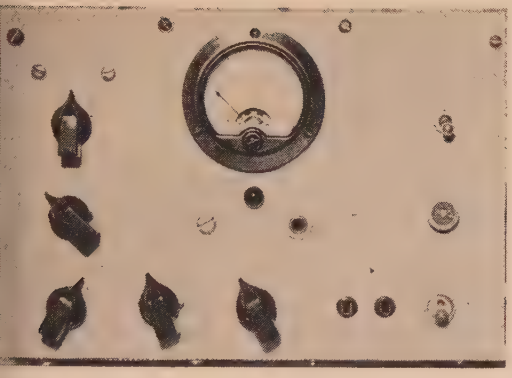
[*Continued on page* 111]



1. Hindin; 9641 Citations CQ; Oct. 1958, p. 35.

A Versatile 10 Watts, 6 to 160 Meters

(With self contained 6 volt D.C. and 110 A.C. power supply)



Bob Perthel, W9MWD
2408 North 83rd Street
Wauwatosa 13, Wisconsin

Many times in the past I had wished I had a small transmitter for local contacts, beam tuning, field day, mobile operation, or to keep a sked the day the big rig went up in smoke. About a year ago the junk box coughed up enough stuff to make this little rig possible. Since then it fulfilled all of the above, has been service as a band edge marker, low power source for SWR measurements, absorption wavemeter calibrator, signal generator for receiver alignment, a mobile PA system, a crystal checker, and its power supply was used to test experimental circuits.

The only components that the junk box did not provide were the 6AX5 rectifier and the 365-mmfd condenser in the pi-network. This condenser is a miniature variable of foreign manufacture. It is 3/16 of an inch thick and 1½ inch square and has a ¼ inch shaft (it sells for 69 cents and appears in several current catalogues).

The chassis is a standard 5x9½x2 inch that had too many holes in the wrong places, so the top was cut off leaving ½ inch around the edges to bolt down a 5x9½ piece of aluminum salvaged from a transcription disc. The sides and front panel were also cut from transcription aluminum. The top cover and bottom were made of scraps of Reynold's "Do-it-yourself" aluminum that were left over from shielding the big rig. Both transcription discs and Reynold's aluminum can be cut with an ordinary household scissors.

Naturally, the band switches in the junk box didn't have the contacts in the right places. This condition was remedied by drilling out the rivets and using nuts and bolts to refasten them in the right places. Tiny nuts and bolts for this purpose can be bought in hobby shops for about one cent each.

The coil forms, variable condensers and power switches were salvaged from BC-610 tuning units.

The modulation choke is simply a small power transformer with the high voltage winding used as a center tapped choke. A 6.3 and a 5 volt winding in series are used as a secondary to match a 4 ohm voice coil. When using this unit as an amplifier, the keying jack is opened and a PM speaker is connected to this secondary, for all other uses it is left open. A push-pull output transformer rated at 5 or 10 watts could also be used. When using this arrangement a 4 to 1 impedance ratio is available between the modulators and the power amplifier. This means the modulator operates into a higher impedance than recommended, and clipping of the audio waveform occurs. The use of a small amount of cathode bias on the 6N7 causes this clipping to occur at about 100% modulation. With this arrangement a gain control is not needed and none is included.

The power transformer can be of the special type with both 110 volt and vibrator primaries, or a replacement type with two 6.3 volt secondaries of at least 4 amperes each can be used. The high voltage secondary must not exceed 320 volts each side of center tap to respect the 450 volt cathode to filament rating of the

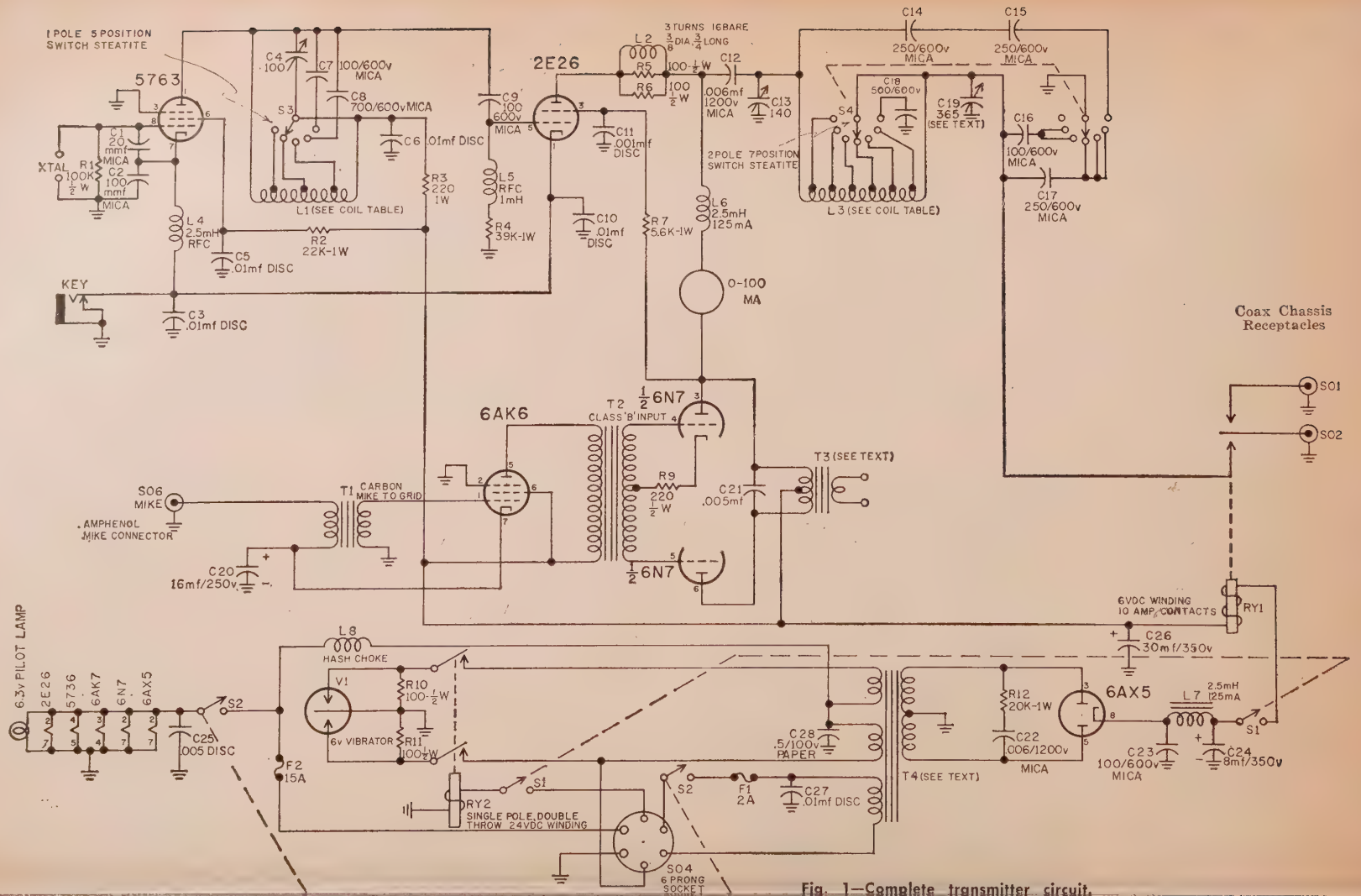


Fig. 1—Complete transmitter circuit.

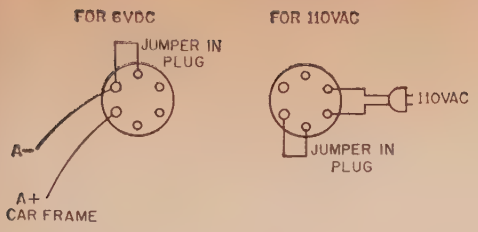
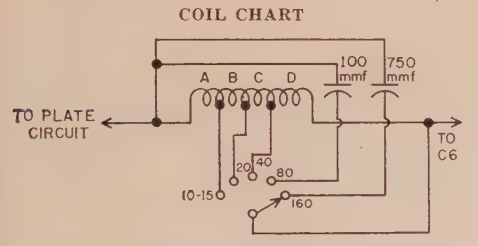
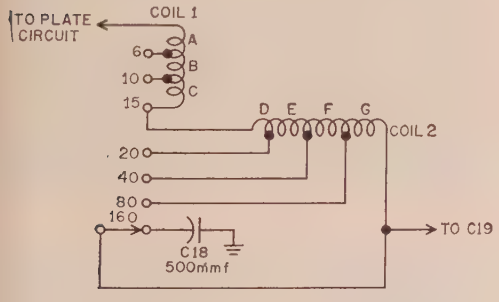


Fig. 2—Power plugs for 110 ac and 6 volts dc.



L1-54 turns close wound on ½" ceramic form.
160 section—A+B+C+D+750 mmf condenser.
80 section—A+B+C+D+100 mmf condenser.
40 section—A+B+C.
20 section—A+B.
10 section—A.
Section A—8 turns #16 enamel, close wound.
Section B—16 turns #22 enamel, close wound.
Section C—10 turns #22 enamel, close wound.
Section D—20 turns #22 enamel, close wound.
L3—Coil 1 and 2 are switched as follow;
160 meters-section A+B+C+D+E+F+G.
80 meters-section A+B+C+D+E+F.
40 meters-section A+B+C+D+E.
20 meters-section A+B+C+D.
10 meters-section A+B.
6 meters-section A.



Coil 1—⅝" diameter self supporting coil form;
Section A—4½ turns #12, spaced the diameter of the wire.
Section B—6 turns #12, spaced the diameter of the wire.
Section C—3½ turns #12, spaced the diameter of the wire.
Coil 2—Wound on 1" diameter phenolic form.
Section D—6 turns #22 enamel, close wound.
Section E—9 turns #22 enamel, close wound.
Section F—10 turns #22 enamel, close wound.
Section G—13 turns #28 enamel, close wound.

6AX5 rectifier, but should be at least 300 or the plate voltage on 6 volt operation will be too low.

Packaging so many components into a 5x6½x9½ inch unit takes a little planning, figures 2 and 3 show how it can be done. The The convenience of a compact unit more than compensates for the effort involved.

This little unit is well shielded and very little radiation takes place without an antenna. TVI is absent although no low pass filter is used. This is probably due to the short leads putting the wiring resonances above the guilty frequencies. The only instability encountered was a slight dip in the amplifier plate current with both tank condensers unmeshed. This was completely eliminated by the parasitic suppressor in the 2E26 plate circuit.

The oscillator uses 160, 80, or 40 meter crystals and provides sufficient output when doubling, tripling or quadrupling to permit the final to operate as an amplifier on all bands, except 6 meters where the final doubles. Twenty meter operation is possible with a 160 meter crystal and 10 meters with an 80 meter crystal when doubling in the final. With 250 watts on all bands except 6 where the output volts on the plates the output is about 10 is about 3 watts. The 2E26 operates with a plate current of 50 milliamperes.

The pi net matches 50 and 75 ohms on all bands and can compensate for some reactance, an extra section on the P.A. coil switch picks up additional capacity as the frequency is decreased to make this possible. At this low impedance (and modest power) very little loss is encountered in the antenna change over relay, even though it is one not designed for the purpose. ■

MARS BULLETINS

US Air Force MARS Western Technical Net

Sundays 2-4 PM Local Time. . . . 7832.5 kc, 3295 kc & 143.46 mc.

Sept. 6—"Net Re-organization and Information".

Sept. 13—"High Speed Data Acquisition for Electronic Computers". Mr. Henry Stover, Western Regional Sales Manager, Beckman Systems Division, A Division of Beckman Instruments, Anaheim, Calif.

Sept. 20—"Radio Interference—What it is". Mr. Al T. Parker, Chief Engineer, Stoddart Aircraft Radio Co., Hollywood, Calif.

Sept. 27—"Equipment Utilization and Conversion Information". USAF MARS Western Technical Net Members.

Oct. 4—"Bowdoin Arctic Exploration". Mr. John L. Reinartz, Manager, Amateur Service Dept., Eimac Co.

Oct. 11—"Net Session and Conversion Information".

Oct. 18—"A PNPN Switch (An Example of Molecular Engineering)". Mr. James Gibbons, Stanford University Electronic Research Labs.

Oct. 25—"A Review of Parametric Amplifiers". Dr. Glen Wade, Stanford University Electronic Research Labs.

More complete listing next month.

TRIPLING TO 1296

Wayne C. Taft, W1WID/2
49 Glendale Rd.
Belmont 78, Mass.

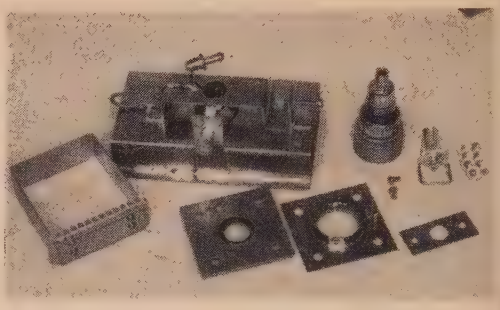
Have you ever considered building your own microwave gear? It really isn't as difficult as it seems at first glance. Contrary to popular belief, you don't have to be a machinist with a PhD in electrical engineering. All it takes is a little ham ingenuity and spare time. The device to be described will put you on the air at 1296 megacycles with minimum effort, provided you have a few watts of drive available at 432 megacycles. You can build the whole thing on your home workbench with only a few simple tools and you won't even have to bribe a machinist friend into making parts for you!

Some time ago, the author decided to give 1296 a try. The original goals included a receiver with a 10 *db* noise figure, a transmitter with 10 watts output, and an antenna with at least 10 *db* gain. The receiver that evolved has previously been described.[1] As yet, nothing has been concluded concerning the easiest type of antenna to build or use. It is the purpose of this article to describe a simple, but effective transmitter, several of which are now in use.

The first problem in the design of such a transmitter is the choice of a tube. Of the few tubes that would be suitable for this frequency, the 2C39 in a grounded-grid circuit seemed to be the best choice. Since a transmitter capable of 20-30 watts output on 432 megacycles was available, the logical thing to try was tripling from that band.

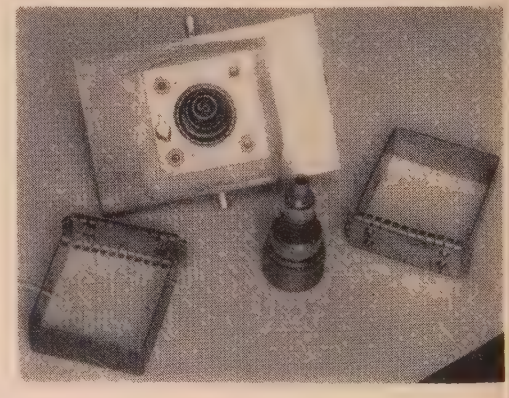
At first, a tripler using coaxial line input and output circuits was tried. It was found, however, that such a configuration was prone to self oscillation, and did not have a wide enough tuning range to accommodate the several makes of 2C39's that were available. Furthermore, several machined parts were required for the construction of the tripler. After several unsuccessful attempts to make the coaxial tripler work, a new configuration was tried.

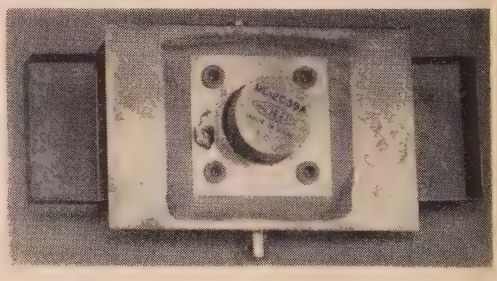
The new tripler uses a quarter wavelength strap-line input circuit between cathode and grid with the input tapped directly on the line. This line is tuned by a small capacity tab. The output circuit consists of a rectangular TE_{101} cavity with the grid and plate of the tube connected across it. The cavity takes the form of a rectangular box about the same shape as a large match box, and is tuned by moving the ends of the box in and out. The box ends are sliding plates with finger stock along the edges of the plate. Connections to the tube are made with finger stock that has been preformed into contact rings. The cathode contact ring is mounted directly on the input line, while the grid and plate contact rings are mounted on brass plates



Tripler components before assembly.

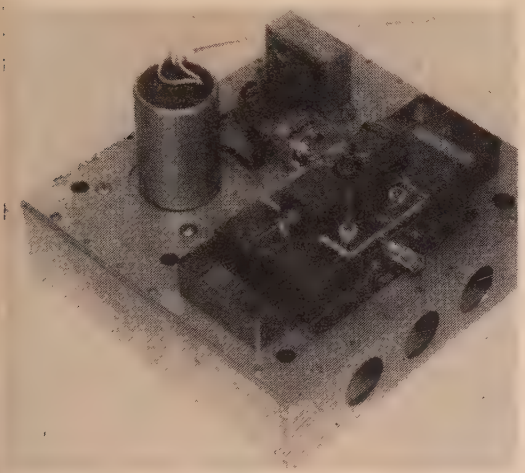
View of 2C39A socket and tuning rectangles.





Top view of completed assembly

These plates are in turn mounted on the top and bottom of the outside of the cavity, but are insulated by sheets of teflon, or polyethylene. Bias and plate voltages are fed directly to these contact ring plates. They are cold for *rf* since they are on the outside of the cavity. Output coupling to the cavity is accomplished by using a small loop soldered directly to a *BNC* type coax jack. This jack is set in a hole in the cavity wall and may be rotated to adjust the loading. It may be clamped in place after final adjustments have been made. In operation, the tripler



Complete unit showing assembly mounted on chassis with filament transformer and blower motor.

is mounted upside down on a small chassis along with a filament transformer and a small squirrel-cage blower aimed at the anode of the 2C39.

Obtaining the parts for the tripler should be a simple matter, since most of the parts are fabricated from 3/64" sheet brass. The required finger stock and contact rings may be scrounged from various pieces of surplus gear, notably the ASB-5 receiver. A simpler method of obtaining the required finger stock is to *buy* it, even though this may be against your better judgment. A complete set can be purchased for about six dollars. Instrument Specialties Corp., Little Falls, New Jersey makes a complete set of contact rings for the 2C39. The catalog numbers are as follows: plate contactor—#97-70A, grid contactor—#97-74A, cathode contactor—#97-76A, heater contactor—#97-280A, flat finger strip—#97-110A. The dimensions of the other cavity parts are specified for use with this particular set of contact rings. For a considerable saving in cost, you can make your own heater contactor from the head of a cotter pin. The grid and plate bypass plates are held to the output cavity with 2-56 screws and ceramic shoulder washers. A good source is the National XS-9 feed-through insulator which is composed of two such washers.

Tripler Assembly

The assembly of the tripler is straightforward. Most of the individual mechanical components are cut from sheet stock as specified in the drawings. In forming the pieces, all necessary bending may be done with a vise or steel block and hammer, but, of course, a brake would do a neater job if you have access to one.

The most difficult assembly problem is that of soldering the various contact rings to the brass parts which hold them. If too much heat is applied to the beryllium copper contacts, they will be ruined. One suitable method using the cathode contactor as an example is shown in Fig. 1. First, the brass piece is placed flat on

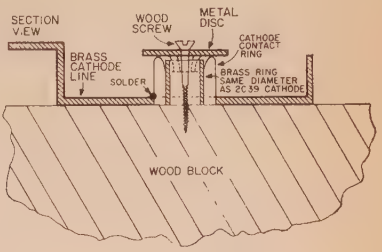


Fig. 1—Specifications for construction of soldering jig for 2C39A contact rings.

a wood block and the contact ring set in place. A brass or copper ring with an outside diameter equal to the outside diameter of the tube element for which the particular contact ring was designed should be cut. The height of the brass ring should be slightly less than the height of the contact ring. The brass ring is then pushed into the contact ring until it also rests on the wood block. Next, a metal disc or plate slightly larger than the diameter of the contact ring should be made. It should have a center hole

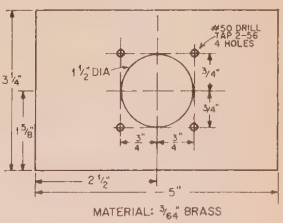


Fig. 2—Construction specifications for Piece 2 the output cavity, plate side.

large enough to pass a wood screw. The disc is then placed resting and centered on the contact ring. Finally, a wood screw through the center hole in the metal disc is used to hold the pieces together during the soldering operation. The purpose of the brass ring and metal disc is to conduct excess heat away from the contacting fingers. Heat for soldering should be carefully applied to the brass piece, and not to the contact ring. A large (100 watt) soldering iron

should be adequate for this job. The flat finger strips are held to the cavity end plates with four 4-40 screws. These pieces may be soldered together, but again, care should be exercised in order to keep from overheating the pieces. Pretinning and use of the proper flux will insure a good solder job.

The remainder of the assembly is not difficult. A propane torch would be a handy tool at this point. Pieces 1 and 2 should be soldered together with their large holes concentric when viewed from the top of the assembly. Piece 3 should then have its contact ring soldered in place. Following this, pieces 3, 4, 5, and 6 may be soldered in place on piece 1. It is important to line up the three large holes in pieces 1, 2, and 3. Some type of centering mandrel would be useful during the assembly for this purpose. A simple one can be made from a short piece of rod and some appropriate cardboard discs. The final assembly is obvious from the photographs.

The unit shown uses sheet metal handles to move both end plates in and out of the cavity. On some units that were built, one of the end plates was arranged so that it could be moved in and out by turning a screw, but the fine tuning thus afforded was found to be unnecessary.

Connection to the tube filament is made with a short piece of shielded wire with its braid soldered to the outside of the cathode line at several points. Although copper or silver plating the finished assembly would no doubt improve the operation of the tripler, good performance was obtained with no plating at all.

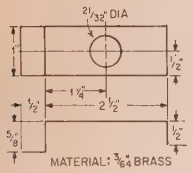


Fig. 3—Specifications for piece 3, the input line.

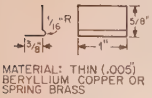


Fig. 4—Piece 4, the input tuning tab.

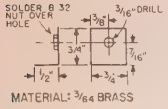


Fig. 5—Piece 5, bracket for input tuning screw.

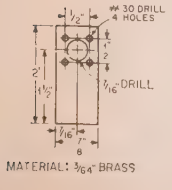


Fig. 6—Piece 6, bracket for BNC input connector.

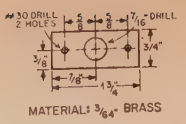
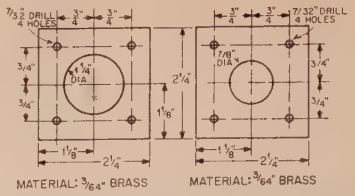


Fig. 7—Piece 7, output connector clamp.



Figs. 8 & 9—Pieces 8 & 9, plate and grid bypass plate.

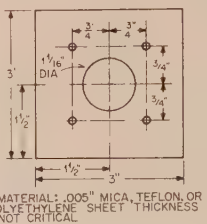


Fig. 10—Piece 10, plate bypass dielectric sheet.

Fig. 11—Piece 11, grid bypass dielectric sheet.

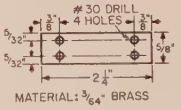


Fig. 12—Piece 12, cavity end plate. (Two required)

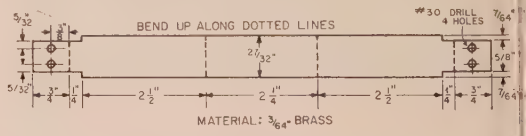


Fig. 13—Piece 13, output tuning handle. (Two required)

Fig. 14—Piece 14, output coupling loop.

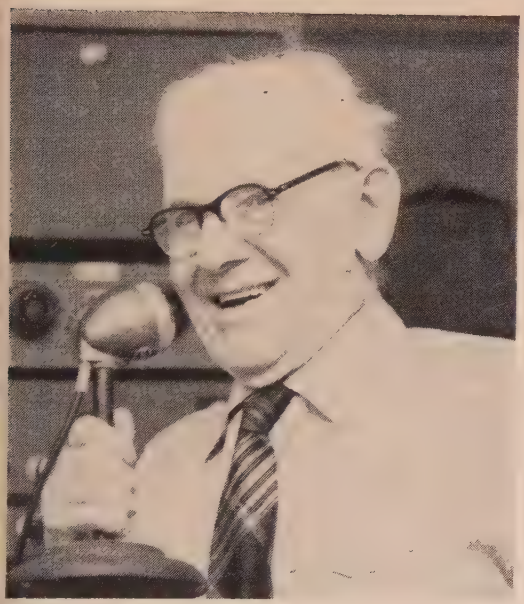
Results

Results using this tripler have more than justified the effort expended in constructing it. The cathode circuit tunes properly and no trouble has been experienced in driving the tube. The plate cavity was found to tune from 1200 to 1400 megacycles quite smoothly. The plate circuit tunes rather like an 80 meter (DC band) final: tune for a plate current dip, in

[*Continued on page* 101]

The Mighty Purple Pajama III
Henry P. Broughton, K2AE

Frank Biloon, K2ECY
626 Elm Terrace
Riverton, N. J.



It is here recorded with deepest regret and sympathy that Henry Broughton, "The Mighty Purple Pyjama No. III" as he was affectionately known, passed on to his just reward in the land of the "Silent Keys" May 27, 1959. Henry was at 94 (less one month) the oldest living member of the Old Old Timers Club which organization requires proof of 40 years of amateur radio participation. Heavily active as a ham from 1893 to the day of his death, he has employed the astonishing group of illustrious call signs 9SD, W9SD, 9JM, 8NJ, W2OIV and K2AE. His first "modern" ham station was 9SD in 1913 using Ford Spark Coils. Some of Henry's original equipment has been on exhibit at the ARRL museum for many years.

Besides being the head of that venerable organization "The Pyjama Club," known for populating a segment of the 75 meter band in the wee hours of the morning, K2AE was always most active in the Old Old Timers Club, the Professional Loafers Club, the Schenectady Amateur Radio Association where he was elected a lifetime member and most of all the Schenectady County Emergency Net. Preparedness, and Assistance in Public Service Emergencies he always considered the most important aspects of amateur radio. At his own expense and with considerable concentrated effort he became the mainstay of the communications emergency organization in Schenectady N. Y. during World War II where he outfitted his own home as a light-proof, gas-proof and bomb-proof radio communications headquarters complete with 5KVA of emergency power generating equipment. He used his own station wagon for mobile operation with the South Schenectady New York State Police, the Municipal Police and Fire Departments, the County Police, the FBI mobile radio, the key broadcast station in the area and the Schenectady County Wartime Emergency Radio Service.

During World War I his patriotic efforts professionally were directed towards maintaining the only source of electric power to the Northwestern Indiana area and providing warplants with reconditioned heavy metalworking machinery which he had collected and worked on for years as a secondary hobby. Such equipment was virtually non-existent at the sudden time of need.

Henry Broughton never laid claim to any major role in spectacular or sensational amateur radio activities. His glory lay in the mundane constancy of solid everyday effort without which our country could never have achieved its significant stature. Perhaps his greatest moments occurred during five days in 1893 when, in an auditorium in St. Louis, Mo., he was the sole and personal assistant to the world renowned genius Nicola Tesla during the performance of hitherto little known experiments in the alternating current electrical art. During these experiments these two men demonstrated wireless communication using electromagnetic waves across the auditorium stage. Unfortunately the learned men present were largely unable to realize the immense significance of what they had just witnessed. Consequently others received credit actually for a repetition of this feat many years later.

Henry Broughton was important to us all as a pillar of his community and as a standard bearer of the amateur radio fraternity. His steady selfless efforts in the realm of public service could well serve as a guide to us all. We shall value the personalized Christmas cards which he sent out to almost a thousand of us each year. We shall miss him on the nets and will think of him often.

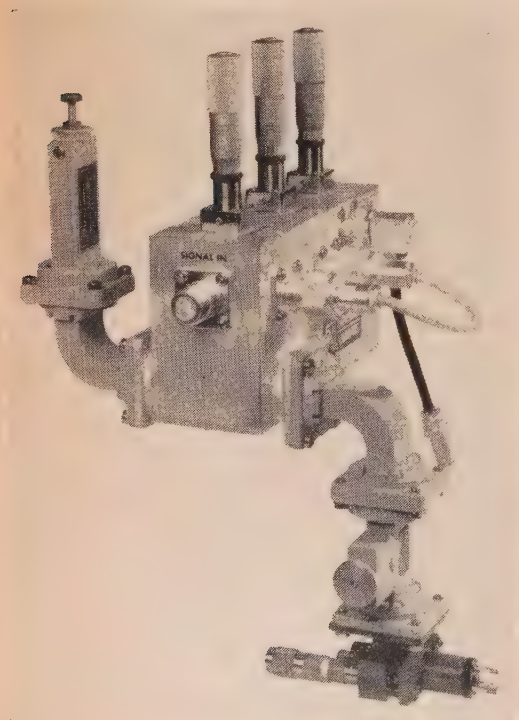
VHF

50mc. 144mc. 220mc. 420mc. and above

by Sam Harris, W1FZJ
P.O. Box 334, Medfield, Mass.

Two Meters for Techs August 21, 1959

The FCC has granted the Technicians request for two meter operating privileges commencing August 21, 1959. For reasons advanced by many who wrote the FCC in answer to their request for advice, the privileges allow operation in the 145-147 *mc* portion of the band. The lower 1 megacycle has been reserved for the private use of the few dozen "old timers" who have been holding it down for the past few years. (Apparently the commission still thinks they will do something in this portion of the band that can't be done in the new band.) In any event, the 2 megacycle wide band will certainly provide lots of room for tech activities. It will be interesting to see how long it takes for the techs to grab off the top honors on this band. See you there?



1296 Paramp converter in use at W1BU. I. F. out is 50 mc (six meters). Pinging frequency is 12 KMC. Noise figure less than 2 db.

States Worked Column for Techs— 145-147 mc

It is the logical thing to start such a column as quickly as possible now that we are allowed to use the frequencies from 145-147 *mc*. As a great number of the technicians will be using the band as soon as permissible, they will be starting to operate two meters at the same time. So-oo-o, *send us regularly* your listing of the states you have worked on two meters. The following information should be included in the information: the state worked and call of the station worked in that state; approximate number of miles, and frequencies of both stations.

Sporadic E on 2 Meters

The long distance openings experienced during June and early July bring back the old controversy about sporadic E skip on two meters. The June 17th opening which allowed W2ORI, Lockport, New York, and VE3ELA to contact W5YYO and W5MJD (near Amarillo). The June 28th opening between W5SFW (Amarillo) and W4GJO (Sarasota, Florida). The July 4th opening from W5SFW to VE3 land and the east coast reception of WØIC's (Denver) signals are all possible examples of "Sporadic E" type propagation, Generally the weather map will tend to disprove

Art Klinger (K4HEA) at operating position. Rig is located at Clemson College where Art is studying Agricultural Engineering.

the "E skip" theory. The fact that six meters has extremely intense and very short skip at the same time can be used to prove either case.

Regardless of what the propagation medium is, the best way to take advantage of it is to be on the air when it happens.

Galveston Convention

Galvestion or Texas itself might not be the home of all the VHFers in the world, but there surely cannot be a nicer gang of VHFers anywhere in the world. Such hospitality! Such enthusiasm!

Although unable to make the convention myself, Helen, the XYL, W1HOY, did attend and the forgoing and following are bits gathered from her, when she was able to settle down after her Texas trip.

The number of VHFers in attendance at the convention was not as great as at other conventions we've attended, *but*—territory covered as far as area concerned, was much greater and in the long run it measured out about the same. Programming was very good, not too much squeezed into too short a time; plenty of time left over to rag-chew and meet some of the gang.

Kind of a shock to Helen that there weren't more VHF gals but she did meet K5BDL, Rosemarie Randolph, VHF Editor of the "Moniter," a very good publication from that area. Also met K5CRJ, Sarah Watts, an avid six meter gal.

First and foremost, as far as personalities go—there was one well-known Waldo Townley, W5FEK, Chairman of VHF activities at the convention. Waldo did a fine job and is to be congratulated. Next, Helen met one of the DX gang that she never expected to meet; that was XE1GE, Geof Lord, who spoke at the VHF breakfast, and a fine job he did too, being called on unexpectedly, to say a few words.

Some of the better-known calls (and the people that went with them) who attended were W4HHK, W5FEG, K5IPL, W5ETA, W1HDQ and W1PYM. Some of the states represented by the gang were: TEXAS, Oklahoma, Arkansas, Tennessee, New York, Connecticut and Massachusetts. Naturally Mexico was represented by Geoff Lord, XE1GE.

Helen had a wonderful time and would like to thank the gang for same. Only one objection: VHF Breakfast at 0700.

Beloit, Wisconsin Information from Bob, (W9GAB) concerning 432 *mc*. "I have just finished my new antenna for 432 *mc*, the array consists of four, eighteen element yagis, stacked eight feet apart horizontally and vertically, for a total of 72 elements."

"Each yagi is 12 feet long, with a boom diameter of 1¼". The developed gain from the 5.3 wavelength boom is 18 *db*, making a total gain for the array close to 24 *db*, equivalent to an 18 foot diameter parabolic dish. Each yagi is stacked apart so that the aperatures of each prospective yagi just touches, making it possible to get near 6 *db* stacking gain for four antennas."

"The beam is highly directive with the main lobe approximately 10 degrees wide both in the horizontal and vertical planes. Secondary lobes are present but diminish in intensity from the proceeding one by 18 *db*."

"The array is mounted atop the 65 foot steel tower, high and clear of all obstructions. Power is fed to antenna through 65 foot of R635U and a preamp for the receiver is mounted at the antenna."

"We wish to make schedules for 432 *mc* work using 144 *mc* as liason and would appreciate hearing from any interested parties. Frequencies are 144.020 and 432.088." *Sounds like you're really in there working at it Bob. Hope you get lots of "interested parties" and have lots of good luck.*

Fresno, California Bill Wurts (K6EJI) sends the following quickie: "The Fresno Amateur Radio Club is planning to put their two meter repeater back in operation on top of Bald Mountain sometime in late summer or fall. The location and elevation will be a big step forward to VHF operation in California." *Thanks for the dope, Bill, hope you'll let us*

Les (W5IPY) looking like he just might "Chew their heads off" during contest operation.

Contest set-up (some time ago) of K6HCP/6. That's Derrol (K6HCQ) monitoring the band.

know what progress is made.

Collierville, Tennessee Good ole Paul Wilson (W4HHK) can be depended upon to be around when two meters opens up. Of course he can also be depended upon to be around when it isn't open, but once more his dependibility paid off. From Paul we hear: "Am pleased to report that the new 432 *mc* antenna has proved itself in a big way. At about *0712 CST* on July 4th a complete two-way cw contact was had with W9GAB, Beloit, Wisconsin, a distance of about 500 mi.!!!! Two meters was used for setting it up—fair to good opening on 144."

"After the 432 *mc* QSO, Bob played tape recording of my 432 signal over his 144 *mc* ssb rig, very exciting. We had tried the night before, unsuccessfully, although we heard each other then. Bob's reception of my 432 *mc* signal was quite good at times, better than reception here; so looks like I need to improve on the receiver." *Congratulations!*

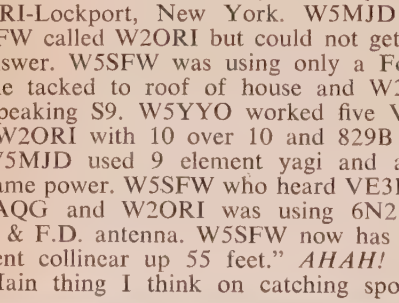
At the Galveston Convention Paul came through with the news that on June 13, 14 and 15, Kansas and Oklahoma were booming through on two meters at his QTH in Tennessee. Watching two and six meters surely can be a great help for spotting openings on the higher frequencies.

Once more Paul, you've done it! Wonder what it feels like to be making those "firsts." Keep it up boy, all the VHF gang is with you and pulling for more and better "firsts" for you.

Amarillo, Texas Phil (or "Slew Foot Willy") W5SFW, was first to report BIG NEWS on two meters on June 17th. "From 1945 P.M., CST until *2130 CST*, on and off, W5YYO and W5MJD worked VE3ELA, VE3AQG and W2ORI-Lockport, New York. W5MJD and W5SFW called W2ORI but could not get him to answer. W5SFW was using only a Folded Dipole tacked to roof of house and W2ORI was peaking S9. W5YYO worked five VE3's and W2ORI with 10 over 10 and 829B rig."

"W5MJD used 9 element yagi and about the same power. W5SFW who heard VE3ELA, VE3AQG and W2ORI was using 6N2 and VFO & F.D. antenna. W5SFW now has a 16 element collinear up 55 feet." *AHAH!*

"Main thing I think on catching sporadic E on Two Meters is: listen on six meters for stations contacting each other on extremely short skip at about the midway point for maximum sporadic E. skip; then point 2 meter antenna into this heavily ionized cloud. In last case W8 in Ohio and Michigan were heard working Illinois and Tennessee on six. Skip here was barely down to Missouri, but the cloud 7 and 9 land was very short." *Seems like this column this month is mainly Congratulations. We surely like to extend same to all of these VHF boys who have been working and listening patiently for years, hoping to someday be able to make it. Much, much good luck Phil!*



Wonder if it's always this neat or did he "dood" it just for us. Where? at W4YOP's QTH of course.

Fritch, Texas Along the same lines we hear from Merrel Penney (W5YYO): "On June 17th, 1959, at *1948 CST* I worked VE3AEZ on 144 *mc*. At 2053 I worked W2ORI on 144 *mc*. The band opened in that direction for one hour and five minutes. Other stations worked between 2000 and 2045 were VE3ELA, VE3DAA, VE3AQG and VE3DIR. No other signals were heard except in that area. All contacts were made by phone transmission and all signals were Q5-S9+."

"The rig here is a 522-829B, 120 watts input. The receiver is an HQ160, a Tecraft converter and a 10 over 10 hi-gain yagi antenna."

"Activity here in my area isn't very good but it is picking up." *I'd say this opening ought to give a good 'Shot in the arm' to two meter activity almost anywhere. Very pleased to receive your information also Merrel and to hear that you had as many contacts as you did. Once more, Congratulations!!*

Saddle Brook, New Jersey Jack Tomkins (K2HHS), sends two meter news from New Jersey way: "The two meter Meatball Net and club held its meeting in June and many changes came about. First the name of the club was changed to "The East Coast VHF Society. This includes all frequencies, 50 *mc* and up. New officers elected were: Pres.-K2YVE; Vice Pres.-W2QCR; Sec.-W2SWI Treas.-K2EWL; Activities Mngr.-K2HHS."

"Annual Hamfest will be in Saddle Brook Park, Saddle Brook, New Jersey, on July 26th." *Sorry we didn't get this in time, Jack, but hope it was a huge success.*

Lexington, Kentucky Seldom heard from Kentucky and Bernie Nickles (K4BPY) sez:

"Have been on six for one year and have picked off 36 states and three countries. This with the worst case of TVI you have ever heard of. I am going to be in South Carolina from August 10th to the 21st, so the fellows needing S.C. might listen for me around 50.09 *mc*. I will have a Seneca and a five element beam as high as I can get it." *Fine business Bernie. Don't imagine you'll have to look too hard for contacts while you're there.*

Memphis, Tennessee More news from Tennes

[*Continued on page* 92]

VHF Contest Results

Alabama

Call	Contacts	Countries	Score	Band
K4BEI 4	52	24	2496	50
K4HPR	8	3	48	50
K4HPR	6	2	24	144

Arizona

Call	Contacts	Countries	Score	Band
K7DVO	39	5	390	50

Arkansas

Call	Contacts	Countries	Score	Band
K5IPL	9	6	108	50

California

Call	Contacts	Countries	Score	Band
K6TJL/6	132	21	5544	50
W6SDW/6	102	11	2244	50
W6PUZ	171	6	2052	50
W6KQD	66	9	1188	50
K6EOR	41	5	410	50
W6TTD	59	3	354	50
WA6AGA	7	4	56	50
K6TJL/6	69	20	2760	144
W6QVR	39	14	1092	144
WV6AGA	29	11	858	144
W6TBS	98	4	784	144
W6ASH	33	10	660	144
WV6CCN	34	9	612	144
W6AKC	53	3	318	144
W6ITZ	16	8	256	144
WV6CQW	22	4	176	144

Connecticut

Call	Contacts	Countries	Score	Band
W1KLK	89	53	5874	50
K1ADK	66	19	2508	50
W1YOL	19	9	306	50
K1CRQ	160	43	13760	144
KN1JVS/1	84	28	4704	144

Delaware

Call	Contacts	Countries	Score	Band
K3AZH	35	15	1050	50
W3URR	37	12	888	144

Florida

Call	Contacts	Countries	Score	Band
K4PPX	30	2	120	50
K4SCS	17	2	68	50
K4DZP	15	2	60	50

Georgia

Call	Contacts	Countries	Score	Band
K5AWT/4	131	53	13886	50
K4TAY/4	27	14	756	50
W4GIS	25	9	450	50
W1VVZ	9	5	90	50
W4GIS	7	3	42	144

Illinois

Call	Contacts	Countries	Score	Band
W9ROS	207	42	17388	50
K9DIB	134	23	6084	50
K9DEB	88	15	2625	50
K9EEC	26	7	364	50
K9PWL	51	24	2448	50
W9FTT	60	11	1320	144
K9EEC	49	9	882	144
W9GLR	19	6	228	144
KN9OUJ	36	3	216	144
K9OEV	12	4	96	144

Indiana

Call	Contacts	Countries	Score	Band
K9GFQ	97	50	9700	50
K9KFL	100	39	7800	50
K9MMH	59	34	4012	50
K9PGK	22	5	220	50
W9UKG/9	28	13	728	144

Iowa

Call	Contacts	Countries	Score	Band
WØBSQ	30	13	780	50

Kansas

Call	Contacts	Countries	Score	Band
WØITF	54	16	1728	50
WØYZZ	49	14	1372	50
WØHAJ	10	5	100	144
KØITF	7	5	70	144
WØYZZ	4	2	16	220
KØITF	3	2	12	220

Kentucky

Call	Contacts	Countries	Score	Band
K4BPY	12	8	192	50
K4ZYZ	9	4	72	50

Louisiana

Call	Contacts	Countries	Score	Band
K5AEY	40	14	1120	50

Maine

Call	Contacts	Countries	Score	Band
K1GPJ	39	18	1404	50

Maryland

Call	Contacts	Countries	Score	Band
W3DCP	59	15	1770	50
K3CRD	32	11	704	50
K3MYR/3	14	12	336	50
K3DZO	43	13	1118	144
KN3EXR	37	10	740	144
W3HB	22	9	396	144
W3LCC	11	6	132	220

Massachusetts

Call	Contacts	Countries	Score	Band
W1HOY	199	38	15124	50
WINBN/1	166	45	14940	50
W1TQZ	72	21	3024	50
W1PYM/1	37	20	1480	50
K1DRX	23	10	460	50
W1KSZ	20	7	280	50
WIPMC	51	21	2142	144
WINBN/1	33	15	990	144
KN1IEB	33	8	528	144
K1GYM	23	7	332	144

Michigan

Call	Contacts	Countries	Score	Band
K8DKR	86	27	4644	50
K8HWW	47	7	658	50
W8IYI	25	7	350	50
W8VBH	27	14	756	144
K8BGZ	19	16	608	144

Minnesota

Call	Contacts	Countries	Score	Band
WØHPS	1	1	2	50
WØPYC	1	1	2	50

Mississippi

Call	Contacts	Countries	Score	Band
K5HUW	23	10	460	50

Missouri

Call	Contacts	Countries	Score	Band
KØIQH	75	10	1500	50
WØWKG	75	9	1350	50
WØKMV/Ø	43	12	1032	50
KØBGW	44	9	792	50
WØLFE	20	15	600	144
KNØTCB	13	6	156	144

Nebraska

Call	Contacts	Countries	Score	Band
WØWRT	12	5	120	50

New Hampshire

Call	Contacts	Countries	Score	Band
WIMHL/1	308	47	28952	50
W1KGK	19	9	342	50
WIMHL/1	149	32	9536	144
W1IQD	2	2	8	144
WIMHL/1	4	4	32	220

New Jersey

Call	Contacts	Countries	Score	Band
K2RRG	300	69	41400	50
K2LNS	111	38	8436	50
K2OIQ/2	83	39	6474	50
K2PTD/2	60	25	3000	50
W2EIL	66	17	2244	50
K2KJI	209	46	19228	144
K2KIB/2	83	27	4182	144
K2OIQ/2	67	29	3886	144
W2MZS	91	20	3640	144
W2QJY	69	19	2622	144
K2VPQ	56	11	1232	144
W2GRD	42	13	1092	144
W2QKV	31	10	620	144
KN2SIV	43	7	602	144
K2AXQ	14	7	196	220

New York

Call	Contacts	Countries	Score	Band
K2VIX	188	41	15416	50
W2PTG	240	32	15360	50
K2RRM/2	117	47	10998	50
K2CBA	103	41	8446	50
K2SZJ	110	35	7700	50
WA2DCM	134	23	6104	50
K2DBB	73	29	4234	50
W2SZ	87	24	4176	50
K2ERQ	82	24	3936	50
K2SKB/2	65	25	3250	50
K2GVL	56	10	1120	50
K2CVG	28	20	1120	50
W2GSB	42	13	1092	50
W2RHQ	30	10	600	50
W2EMW	26	8	416	50
W2UKA	13	6	156	50
K2CUQ	3	3	18	50
K2QEP	128	38	9728	144
W2CLE/2	87	25	4350	144
K2RTH	60	20	2400	144
K2LEG	47	17	1598	144
W2SZ	45	13	1170	144
W2LXE	33	12	792	144
W2IP	24	16	768	144
K2UOY	37	13	962	144

North Carolina

Call	Contacts	Countries	Score	Band
W4MOE/4	23	14	644	50
W4BUU	2	1	4	50

Ohio

Call	Contacts	Countries	Score	Band
W8UMF	218	47	20492	50
K8GYK	106	25	5300	50
W8SGX	55	32	3520	50
K8BRU	67	18	2412	50
K8HWJ	31	11	704	50
K3CXZ/8	16	7	224	50
W8SFG	39	17	1326	144
KN8LWQ	18	8	288	144

Oklahoma

Call	Contacts	Countries	Score	Band
W5IPY	7	2	28	50

Oregon

Call	Contacts	Countries	Score	Band
W7GUH	24	6	288	50
W7CCM	20	6	240	50

Pennsylvania

Call	Contacts	Countries	Score	Band
W3AVV/3	137	18	13152	50
K3ABC	140	32	8960	50
W3JMY	116	37	8584	50
W3ZOR	81	27	4374	50
W3AMO	73	22	3212	50
W3KWH	73	17	2482	50
W3LDA/3	56	20	2240	50
K3ATX/3	53	20	2120	50
W3OLV	40	19	1520	50
K3IRF	35	17	1190	50
W3ETB	29	14	1022	50
W3ESE/3	33	15	990	50
W3GH/3	26	11	562	50
W3YNC	17	11	374	50
K3BUM/3	55	15	1650	144
W3WJC	33	11	726	144
W3MSR/3	23	15	690	144
K3ATX/3	1	1	2	144

Rhode Island

Call	Contacts	Countries	Score	Band
K1DFU	34	13	884	50
K1CRN	100	22	4400	144
K1JSG	50	29	2900	144
KN1JZN	34	11	748	144

Tennessee

Call	Contacts	Countries	Score	Band
W4ZZ	25	15	750	50

Texas

Call	Contacts	Countries	Score	Band
K5UFW	113	22	4972	50
K5TKR	101	17	3434	50
K5MBZ	100	15	3000	50
W5FEG	70	15	2100	50
K5BDL	71	14	1974	50
K5AON	72	11	1584	50
K5CHF	62	12	1488	50
K5KVE	50	11	1100	50
K5RCZ	54	9	972	50
K5KWB	45	10	900	50
K5TIQ	56	7	784	50
K5RAK	37	7	518	50
W5JHWX	40	6	480	50
K5BKC	46	5	460	50
W4ERX/5	37	6	444	50
K5GHR	37	6	444	50
K5MTK	46	4	368	50
K5PDD	25	6	300	50
K5QAN	25	5	250	50
K5RJU	21	5	210	50
K5BQA	19	5	190	50
K5BBG	23	4	184	50
K5PCN	18	5	180	50
K5ADV	18	3	108	50
K5TEW	23	2	92	50
K5KDY	12	3	72	50
K5BKC/5	15	2	60	50
K5RJU/5	9	2	36	50
K5PDD/5	9	2	36	50
K5PCN/5	8	2	32	50
K5PDD/5	7	2	28	50
K5PC/5	2	1	4	50

Utah

Call	Contacts	Countries	Score	Band
W7QDJ	5	3	30	50

Virginia

Call	Contacts	Countries	Score	Band
W4WUX	63	37	4462	50
KØRTF/4	93	21	3906	50
K4RTG	12	8	192	50
K4KWW	10	5	100	50
W3ML/4	7	4	56	144

Washington

Call	Contacts	Countries	Score	Band
K7BBO	40	7	560	50

West Virginia

Call	Contacts	Countries	Score	Band
K2YWU/8	150	51	15300	50
K8KRO	57	19	2166	50
W8QLP/8	31	15	930	50
W8QLP/8	29	13	754	144

Wisconsin

Call	Contacts	Countries	Score	Band
W9JFP/9	226	45	20340	50
K9AKI	110	25	5500	50

Arizona

Call	Contacts	Countries	Score	Band
W7QLZ	8	3	48	50

Canada

Quebec

Call	Contacts	Countries	Score	Band
K2VTX/BE2	1	1	2	432

Ontario

Call	Contacts	Countries	Score	Band
VE3HW	39	8	624	144
VE3CKR	34	8	544	144

Japan

Call	Contacts	Countries	Score	Band
JA8BU	6	2	24	50

Citizens Radio

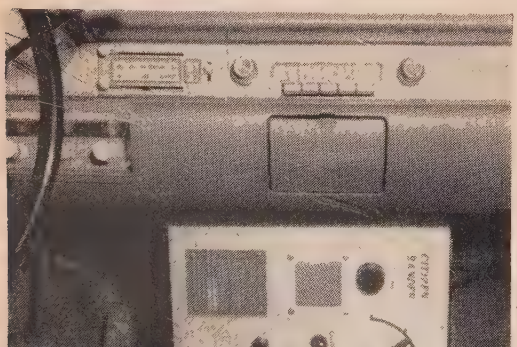
Lee Aurick, W2QEX

Lee brings nearly a quarter-century of communications experience to these pages. As Communications Chief and ranking radio operator in his Division during WW II, W2QEX saw service in the European Theatre. With the ink on his discharge still damp, he was licensed in 1946 and obtained one of the first Extra Class tickets in 1951. From 1954 to 1957, as W1RDV, he was Assistant Secretary of the ARRL. Since 1957 Lee has been on the Advertising Staff of a leading electron tube manufacturer in New Jersey.—Ed.

The review of the "Citizen Bander" in these pages last month was so nicely received by you that the Editor and your reviewer have been encouraged to attempt a regular column devoted to the doings and goings-on of Citizen's Radio. Just how encouraged we'll become will depend entirely upon your interest.

At this point, interest is high considering that the new medium is just one year old this month. Nearly 100 letters and cards on the subject are received weekly at CQ and we believe this to be only the beginning. All inquiries will be answered and the most interesting ones will appear here. Don't forget a stamped, self-addressed envelope or postcard —please!

Future plans include the review and semi-technical discussion of each new piece of equipment for the citizen's band, as well as follow-up reports on items previously reviewed. Perhaps it would be well to make this point now. Any review published here will be made only upon a thorough examination and *field test* of the actual equipment. There'll be no "lab tryouts" or "instruction book run-throughs." Operation of each equipment will be under the conditions in which you'll use it 'Nuff said?



Citizen Mobile

For a follow-up report on last month's "Citizen Bander," let's amble over to the family bus. Time permitted testing of the two units from fixed locations only prior to publication of the review and because only the 115 volt *ac* cables and plugs were provided. The manufacturer states that cables and plugs for 6 and 12 volt *dc* operation are available. However, the instruction manual includes full details for "strapping" the terminals within the power plug for all three voltages. The challenge of installing one of the units in the car was overpowering. It took ten minutes flat, and a six foot piece of heavy gauge 2-conductor cable, to convert the *ac* cable and plug to 12 volt *dc* operation.

Installation

The cabinet was bolted to the under-lip of the dashboard by making use of two ventilation holes in the cabinet, and one existing hole in the dash. One additional ¼ inch hole was drilled in the dash-lip. The cabinet was then securely bolted to the dash.

The unit was then re-mounted in the cabinet and the power cable pushed through a rubber "knockout" in the fire-wall. Here, care was exercised in observing battery polarity when connecting the power-cable to the battery.

A 10-meter whip antenna (a trifle short for the citizen's band) was resurrected and mounted on the left-rear fender of the family Ranch Wagon. A length of RG-59/U coaxial cable (RG-58/U would have been better) was run from the whip terminals to the coaxial fitting on the cabinet. Power on—and the receiver quickly came to life.

The TRANSMIT-RECEIVE switch was moved to TRANSMIT and the two controls on the *rear* of the transmitter chassis were re-tuned for maximum brilliance of the output lamp. Output, as indicated by the lamp, was considerably greater than with the portable whip antenna included with the unit.

Check Out

Test of the new installation started immediately. Reliable communication was established within a 2 mile radius of the home location. And this with the 4 foot portable whip in use at home, and with the station operating from a dubious vantage point atop the kitchen table.

By the time you read this the mobile installation will have made the round trip to the ARRL National Convention at Galveston, and there may be a few words next month as to how it withstood the trip.

By the way, total elapsed time for the complete mobile installation—3 hours and 15 minutes.

Roof Antenna

The next job was to improve the antenna efficiency of the home station. This was accomplished by the installation of a vertical half-wave antenna on the roof. Since some coaxial cable, some lengths of ½ inch aluminum tubing, and a can of paint were already on hand, it seemed that a home-made job was called for. A trip to the local lumber yard and the outlay of 40 cents secured a 14 foot length of 1 x 2 for the mast. Within a few hours the roof was sprouting a bright new vertical.

No construction details will be given on the antenna at this writing, but if you'd like to have a discussion on the construction of suitable citizen's band antennas in a future column, just say the word. Several commercial antennas are now on the way for testing and review. More on this soon.

The improvement in range was more than satisfactory. Good communication was maintained out to 8 miles, and marginal contact was available at 10 miles. Over terrain just a little flatter than hilly Northern New Jersey this distance could likely be increased. The manufacturer, International Crystal Manufacturing Co., conservatively claims a 5-mile range when using a whip on the car and a roof-mounted vertical at home. They mean it.

Next month we'll take a good look at the new G-11 Citizen's Communicator by Gonset. It's just about the smallest radio station you can buy.

Obtaining Your Station License

There is no examination required since there is no operators license to obtain. A station license is a *must* however, and, though the process may seem formidable, it's really quite simple.

The first step is to ask your nearest FCC field office (by phone or card) to send you an Application For Citizens Radio License, Form 505 dated September 1958, as well as Part 19 of the FCC regulations entitled Citizens Radio Service.

FCC Form 505 is free, and you may be lucky enough to get Part 19 free also—it carries a price of 10¢. If your nearest FCC field office is temporarily out of stock you may surely obtain both publications from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. In this case, send 10¢ in coin with your request for Part 19.

It is essential that you have a copy of Part 19, and that you read the regulations carefully. In fact, when you complete your application and have it notarized, you certify, under oath, that you have in your possession a current copy of these regulations.

The license application form is easier to fill out than the one used for amateur licenses.

When you receive your form you will quickly see that the first sheet contains instructions printed on both sides of the sheet. Don't throw this away *yet*.

The second sheet is a work sheet, and should be detached, along with the instruction sheet, at this time. This sheet is your file copy and should be saved.

The third sheet is only half the size of the first two, and, when approved by the FCC, will be returned to you as your actual station license.

The fourth sheet is another full length sheet that contains all the questions found on the work sheet. There is a carbon sheet between the third sheet and the top part of this sheet. Care should be used not to smear this sheet or sheets five and six which also are carbon copies. These sheets are both half-size sheets.

After detaching the instruction and work sheets you may fill in the work sheet with the appropriate information. If your proposed operation will be as an individual and not as a corporation or association, it will not even be necessary for you to answer any of the questions on the reverse side. These apply only to corporations and associations.

Now let's take the items on the application one at a time.

Item 1. —*(a) It is not necessary to list any of the 23 frequencies. You will be authorized to operate on all of them as a Class D station.*

(b) The only emmission permitted Class D stations is amplitude voice modulation for radiotelephone

[*Continued on page* 96]

SURPLUS

by KENNETH B. GRAYSON, W2HDM
Care of CQ 300 West 43rd Street, N. Y. C. 36, N. Y.

One of the handiest things to have around the shack, especially if you do a lot of repair work, is a tube tester. This month we were fortunate in obtaining a tube tester for about twenty dollars. Naturally it is a surplus type and will need a small amount of conversion, but it is a tube tester never-the-less.

Tube testers fall into two basic categories, namely emission testers and transconductance type testers. In the emission type the voltages applied to the tube cause a current to flow. This current is proportional to the quality of the tube. Any amount of current less than rated value is considered as being good, bad or fair, depending upon the reading of the meter. In the transconductance type meter, the elements of the tube are also set to a predetermined voltage, but instead of measuring the amount of current that flows, the control grid is given an AC signal, and the output AC signal is measured. Since the gain of a tube is proportional to the transconductance times a load resistance, we can measure the transconductance directly by using a known value of load and a known signal.

As you can see the transconductance tester actually measures the quality of the tube under "live" conditions. While this is fine for most applications, the final test will always be in the equipment that the tube is used with. Not every perfect tube (as checked on a tester) will work, since little things like circuit capacity, circuit configurations, etc., will affect the operations of a tube.

Usually the transconductance type tester runs about four times the price of an emission

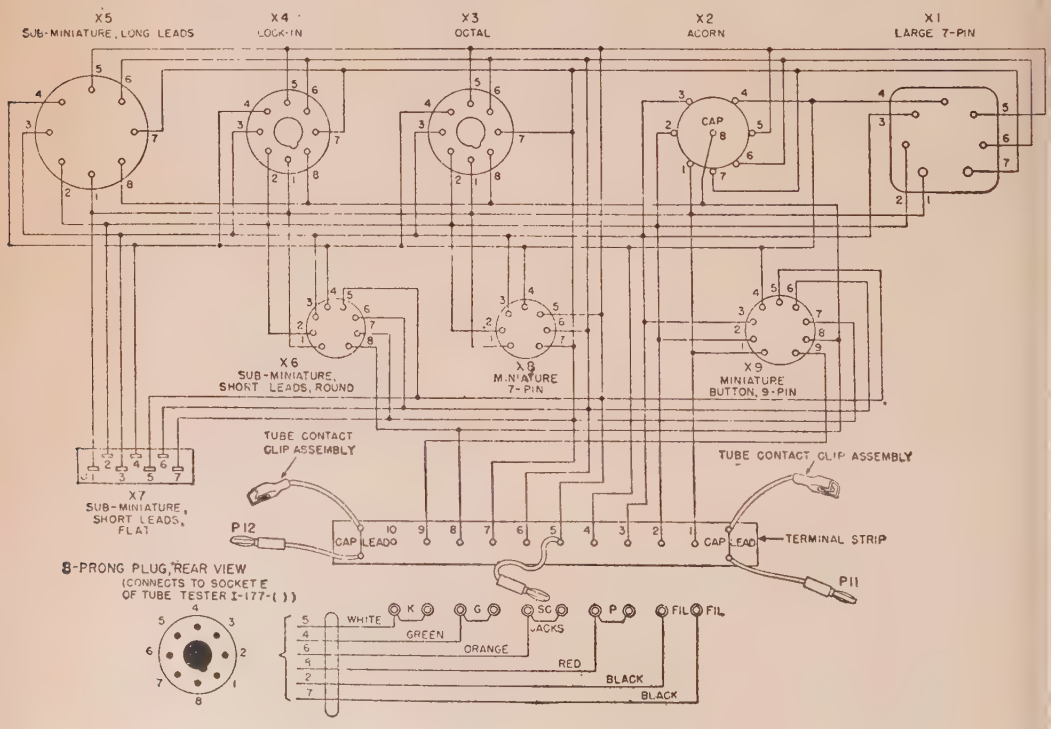


Fig. 1—Circuit of the adaptor for the I-177 Tube Tester.

Parts List

X-3 Loktal Socket
X-4 Octal Socket
X-6 Subminiature socket (ELCO 703BC)
X-7 Subminiature Socket (ELCO 767BC)
X-8 Seven Pin Miniatur Socket
X-9 Nine Pin Miniatu Socket
Banana Jack, Insulate Nylon (Johnson 108-901
Chassis Aluminum 5½x x1½

type tester, and is, therefore, not usually found in the average shack (or TV store either). This is not to say that the emission tester is not worthwhile. On the contrary, the emission tester is an excellent device, but the transconductance type just gives that much more information to the technician.

All of this is leading to the surplus item of the month. The I-177 Tube Tester is a portable tube tester used by the armed forces and recently released to the surplus market. The reason that it has been declared surplus is that it is not as versatile as later models. For instance, there is no provision for testing nine-pin miniature tubes and certain other types. The I-177 was made before the Korean War and has been brought up to date by the use of an adapter. Unfortunately the adapter isn't always available. As a matter of fact we were lucky to find a circuit of the adapter and made our own in a very short period of time.

Looking at the I-177 in its metal case gives the impression that it can do a pretty good job . . . which it can. A second look will show that the front panel has two octal, two loktal and three seven-pin miniature sockets. The reason for this is to eliminate the need for switching the filaments and hence save front panel space. Our first inclination was to add the switches and a nine-pin socket. But where? There isn't a bit of room anywhere, unless you do a butchering job. We just didn't think it

TUBE	SOCKET	FIL VOLTS	FILS	P	SC	G	K	L	R	BUTTON	NOTE
1C8	X5-X6	1.1	4-5	6	7	8	2	0	40	AMPL	OK over 350
1C8	X5-X6	1.1	4-5	6-7	—	2	8	0	60	AMPL	OK over 950
1LG5	X4	1.5	1-3	2	3	6	—	0	28	AMPL	
1Q6	X5-X6	1.1	4-5	7	8	2	—	5	25	AMPL	1
1Q6	X5-X6	1.1	4-5	6	—	—	—	0	0	DIOD	1
1S4	X8	1.5	1-7	2	4	3	—	50	45	AMPL	2
1S6	X5-X6	1.1	4-5	1	8	3	—	5	25	AMPL	1
1S6	X5-X6	1.1	4-5	6	—	—	—	0	0	DIOD	1
1W5	X5-X6	1.1	4-5	7	8	2	—	0	28	AMPL	1
2C51(1)	X9	6.3	1-9	4	—	3	2	70	15	AMPL	
2C51(2)	X9	6.3	1-9	6	—	7	8	70	15	AMPL	
2E31/ CK533AX	X5-X7	1.1	3-5	1	2	4	—	10	30	AMPL	1-3
2E41/ CK551AX(P)	X5-X7	1.1	4-6	1	2	5	—	10	30	AMPL	1-3
2E41/ CK551AX(D)	X5-X7	1.1	4-6	3	—	—	—	0	0	DIOD	1-3
3A4	X8	3.0	1-7	62	3	4	—	60	39	AMPL	2
3B7/ 1291(1)	X8	2.5	1-8	7	—	6	—	40	25	AMPL	2
3B7/ 1291(2)	X8	2.5	1-8	2	—	3	—	40	25	AMPL	2
3E29(1)	X1	12.6	1-7	X	3	6	24	74	10	AMPL	4
3E29(2)	X1	12.6	1-7	Y	3	2	46	74	10	AMPL	4
3Q4GT/G	X8	2.5	1-7	62	4	3	50	50	35	AMPL	2
3S4	X8	3.0	1-7	2	4	3	—	50	45	AMPL	2
6AS7(1)	X3	6.3	7-8	5	—	4	6	70	82	AMPL	
6AS7 (2)	X3	6.3	7-8	2	—	1	3	70	82	AMPL	
6AV6(T)	X8	6.3	3-4	7	—	1	2	53	10	AMPL	
6AV6(D)	X8	6.3	3-4	6	—	—	2	0	0	DIOD	
6AV6(D)	X8	6.3	3-4	5	—	—	2	0	0	DIOD	
6SL7(1)	X3	6.3	7-8	5	—	4	16	41	13	AMPL	
6SL7(2)	X3	6.3	7-8	2	—	1	34	41	13	AMPL	
6SN7(1)	X3	6.3	7-8	5	—	4	16	60	24	AMPL	
6SN7(2)	X3	6.3	7-8	2	—	1	34	60	24	AMPL	
7F8(1)	X4	6.3	2-7	6	—	8	15	60	20	AMPL	
7F8(2)	X4	6.3	2-7	3	1	1	48	60	20	AMPL	
12AH7(1)	X3	6.3	7-8	6	—	5	14	57	25	AMPL	
12AH7(2)	X3	6.3	7-8	3	—	1	25	57	25	AMPL	
12AT7(1)	X9	12.6	4-5	6	—	7	9	73	11	AMPL	
12AT7(2)	X9	12.6	4-5	1	—	2	3	73	11	AMPL	
12AU7(1)	X9	12.6	4-5	6	—	7	8	54	25	AMPL	
12AU7(2)	X9	12.6	4-5	1	—	2	3	54	25	AMPL	
12AV6(T)	X8	12.6	3-4	7	—	1	2	53	10	AMPL	
12AV6(D)	X8	12.6	3-4	6	—	—	2	0	0	DIOD	
12AV6(D)	X8	12.6	3-4	5	—	—	2	0	0	DIOD	
12AX7(1)	X9	12.6	4-5	6	—	7	8	0	19	AMPL	
12AX7(2)	X9	12.6	4-5	1	—	2	3	0	19	AMPL	
12L8GT(1)	X4	12.6	6-7	8	5	1	23	58	15	AMPL	
12L8GT(2)	X4	12.6	6-7	4	5	3	23	58	15	AMPL	
12SW7(D)	X3	12.6	7-8	5	—	—	3	20	0	DIOD	OK over 800
12SW7(D)	X3	12.6	7-8	4	—	—	3	20	0	DIOD	OK over 800
12SW7(T)	X3	12.6	7-8	6	—	2	3	56	23	AMPL	
CK503AX	X5-X7	1.1	3-5	1	2	4	—	17	30	AMPL*	3
CK506AX	X5-X7	1.1	3-5	1	2	4	—	10	48	AMPL*	1-3
CK512AX	X5-X7	1.1	3-5	1	2	4	—	0	31	AMPL*	1-3 (OK over 250)
829B(1)	X1	12.6	1-7	X	3	6	42	76	14	AMPL	4
829B(2)	X1	12.6	1-7	Y	3	2	46	76	14	AMPL	4
832A(1)	X1	12.6	1-7	X	3	6	42	76	14	AMPL	4
832A(2)	X1	12.6	1-7	Y	3	2	46	76	14	AMPL	4
1291(1)	X4	2.5	1-8	7	—	6	—	40	25	AMPL	2
1291(2)	X4	2.5	1-8	2	—	3	—	40	25	AMPL	2
5633/ SN944	X5-X6	6.3	4-6	T	5	3	12	14	23	AMPL	5
5634/ SD828E	X5-X6	6.3	4-6	T	5	3	12	54	25	AMPL	5
5651	X8	OFF	—	1	—	—	2	50	0	GAS-1	
5656(1)	X9	6.3	4-5	8	1	2	6	72	17	AMPL	
5656(2)	X9	6.3	4-5	7	1	3	6	72	17	AMPL	
5687(1)	X9	12.6	4-5	9	—	7	6	70	30	AMPL	
5687(2)	X9	12.6	4-5	1	—	2	3	70	30	AMPL	
6T8(T)	X9	6.3	4-5	9	—	8	7	45	5	AMPL	Similar to 6AQ6 triode
6T8(D)	X9	6.3	4-5	1	—	—	7	0	82	DIOD	Similar to 6AQ6 diode
6T8(D)	X9	6.3	4-5	6	—	—	7	0	82	DIOD	Similar to 6AQ6 diode
6T8(D)	X9	6.3	4-5	2	—	—	3	0	82	DIOD	Similar to 6AQ6 diode

NOTES:
1. Set line adjust to read 1800 on meter.
2. DON'T TAP TUBE.
3. Red dot is lead 1.
4. Use tube contact clip for plate connector.
5. Green arrow is pin 1.

X. Use plate connection closest operator.
Y. Use plate connection away from operator.

Table I

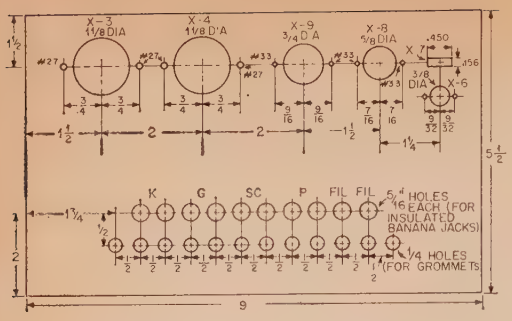


Fig. 2—Chassis Layout for adaptor.

worth while ruining the appearance of the set. Apparently the army felt the same way also, since they made an adapter too. Figure 2 shows the adapter dimensions for the one that we made. We didn't think we would have any need for the acorn tube socket or the large seven pin socket used with the 829B, so we left them out. Likewise we couldn't locate the special socket that was used for the long lead subminiature tubes, so we eliminated that as well. Figure one shows the circuit of the original adapter. When you wire this up you will find that the number one pins are all in parallel, number two pins are all in parallel etc. Just forget about wiring the sockets you eliminate. We used nylon banana jacks for the tube connections and got them in various colors so we could color code the wires. There should be a ½ inch hole in the side of the chassis so as to allow the wire going to the socket on the tube tester to pass through a grommet.

To use the adapter (and we practically quote from the I-177 handbook) selector switch A should be turned to 4. Selector switch B should be turned to 2. Plug the tester into the 110 volt 60 cycle line. Turn the switch marked POWER to ON, wait a minute and press the line test button and adjust the meter to the mark with the LINE ADJ. knob. With all plugs on the adapter disconnected from the jacks, insert the adapter into socket E of the tester.

Make the necessary patch cord connections for the tube under test C (see the handbook or Table I). If any doubt exists, refer to the tube manual or handbook around the shack for the proper pin connections. Connect the plugs to the proper jacks. K stands for cathode, SC for screen, P for plate, FIL for filaments, G for grid. If the tube has a suppressor, connect it to the cathode. When multi-section tubes are being tested, they should be tested one section at a time. Set the filament voltage, always starting at the lowest voltage and progressing higher, to the correct voltage. NEVER apply more filament voltage than the tube is rated for. To do so, even for an instant, can easily ruin a good tube.

Once the conditions are set up, plug the tube into the appropriate socket and test fo shorts. This is done by turning the short te switch from TUBE TEST to 1, and back again slowly. The neon will stay lit on a short, bu may blink once as you progress during th test. On some tubes the neon should stay l on certain settings, but the tube data will sa so in the tables.

For the actual test, the short test switc should be in the TUBE TEST position. Set th knobs L and R to the number listed in Tab I or the handbook. Turn the micromhos switc to 3000 and press the button listed in Tab I or the handbook. The meter should read. the meter is reading in the green sector, th tube is good. If the meter is in the red sect it is weak or bad. Some tubes (marginal one will read in the middle sector. When an exa transconductance reading is desired, turn th L knob to Gm (which is the abbreviation fo transconductance) and read the value directl If the meter goes off scale it will be necessar to change the range by means of the micromh switch.

Some tubes, especially the newer ones, w not be listed in the setting book usually a tached to the I-177. (Make sure you get th book with the tester). As a matter of fact eve Table I doesn't have all of the information c the newer tubes. The way to get around th is to locate a tube manual and check for a tub that has similar characteristics. The majori of the tubes called new are based on olde types, but are redesigned with lower intern capacity, different filament voltages and di ferent basings. In the case of multisection tube they are various combinations of other tube in most cases and tracking the down won't b too difficult. For example, a 6T8 is given Table I. This is actually a triple diode, trioc which is very similar to the 6AQ6. By referrin to the tube manual you can get the corre pin connections and make the test.

Some tubes used now-a-days are identic to others except that they are built muc stronger internally. An example of this is th 6005 which is a 6AQ5 in the older version Getting to know your tubes is a good ste forward in the hobby. Getting a good tub manual, like the Sylvania Handbook, will hel since the manufacturer will keep it up to dat by monthly additions listing new tubes an their characteristics.

BA-41 for the BC-659

We have had a lot of mail from surplu hounds trying to find out a source of the B. 41 for the BC-659. We couldn't find one of direct replacement type, but we did come u with one solution. Using hearing-aid batterie or similar types, you can make a pretty goo replacement. Figure 3 shows how to wi them up to operate properly in the BC-659.

[*Continued on page* 100]

by DONALD L. STONER, W6TNS
P.O. Box 137, Ontario, Calif.

semiconductors

As promised, this months feature item is he completely transistorized six meter station, esigned and constructed by Mel Buechel, V9RPH, 833 Fullerton, Chicago 14, Ill.

The two units are shown in Fig. 1 and 2. he receiver is a single conversion, fixed frequency, xtal controlled superhet. Mel uses it egularly on hidden transmitter hunts near hicago and finds it will give Q5 copy on any ignal that is normally S7 or better on his big" receiver.

The transmitter consists of an RCA 2N384 vertone oscillator driving another 2N384 as n r.f. amplifier. The power input of the final ollector is kept down to 80 milliwatts (4 ma. t 20 volts) to avoid thermal run-away.

The modulator uses a 2N652 (Motorola) riving a pair of 2N408's (RCA) in Class B. he modulator is capable of delivering more ower than is needed, but the additional punch" helps the r.f. get through.

The transmitter oscillator uses third overtone 50 mc. crystals. You may have to select transistors for the oscillator position to be able to drive the final to at least 5 ma. when the final is tuned off resonance. By the same token, you may have to select final transistors to find one that will draw the most current with a given amount of drive. However, random transistor should still provide at least 60 MW input. As with most transmitters of this sort, the oscillator drive provides bias for the final due to base rectification. Therefore, the final will only draw current when drive is applied from the oscillator. Also, if the oscillator fails, the final will not draw excessive current (except Ico) and damage the transistor.

When Mel uses the rig mobile he can obtain about a mile range between mobile units. Also, Mel has been able to work "DX" as far as 35 miles away with a 55 report.

Bargain Corner

Do you remember the transistorized "grid-

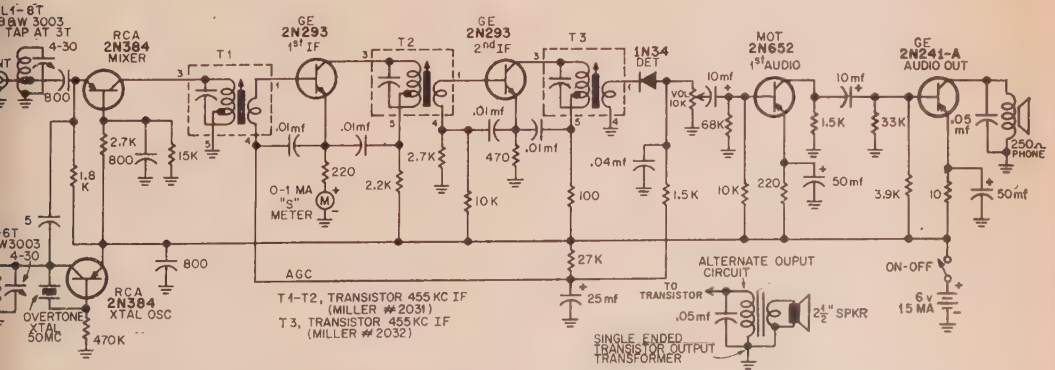
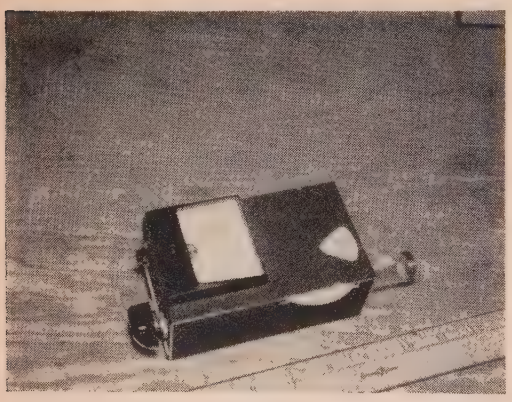


Fig. 1—The receiver section of W9RPH's six meter station. Note that if the crystal is replaced with a 10 mmfd. capacitor, it should be possible to tune the receiver over the band with the values shown. For more "soup," an r.f. amplifier and push-pull output stage could be added.

dip" meter that appeared in RCA Ham Tips a year or so ago? Circuit Products Co., 4044 Midway Dr., San Diego 10, Calif. have come up with a circuit board for mounting the majority of components in this unit. The base material is XXXPmica. The board is tentatively priced at $1.50 and is available from William Cronkhite, 1718 Grevelia, Apt. C, South Pasadena, Calif. or from Western Radio in San Diego. Great things are coming from this company. Look for a complete board for a communications receiver (transistorized) and the same in an electronic key! By the way, you can obtain a free circuit for the "grid-dipper" by sending a SASE to Bill at the above address.

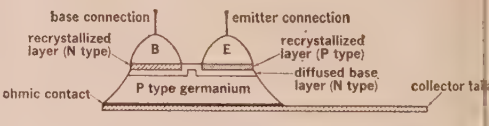
The Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L. I., N. Y. is distributing a new European transistor—type OC170. This unit has an average cut-off of 70 mc. (usable through the FM band) with a dissipation rating of 60 mw. in Class A. Maximum Ec is -20 volts and 1c is 10 ma. Very complete engineering data is available from Amperex and a circuit for a short-wave oscillator/mixer and another for a 10.7 mc. i-f circuit is included. I believe this transistor can also be used in W9RPH's six meter gear, with no circuit changes. The new OC-170's are available from Amperex distributors, and are priced at abo $4.50. If you have trouble locating an A perex distributor, drop a line direct. They w be glad to assist you.

Technically speaking, the new transnstor both alloyed and diffused at the same time. is built up on a piece of P-type germaniu Two small metal pellets are placed on the ge manium. Pellet B, the base, contains only N-type impurity. Pellet E, the emitter, co tains both a P-type and an N-type impurit When this assembly is heated at a certain te perature, the germanium dissolves into t metal pellets until saturation is reached, a the pellets impurities diffuse into the so germanium. This process makes it possible readily mass produce transistors with a ba layer only a few micorns thick for sho transit time and high cut-off frequencies. T rejection rate is also very low which mak possible the low price. The collector-to-ba capacity of the transistor is very low. With t



This is the printed circuit version of the RCA transistorized grid dipper. See text about obtaining the circuit board.

Introducing Ampere's new OC-170 transistor. This device will work up through the FM band, is a bargain for experimenters (see text).



The "inside dope" on the OC-170 transistor. It is both alloyed and diffused at the same time (see text) and is built up on a piece of germanium. It should make an ideal r. f. transistor for QRP rigs.

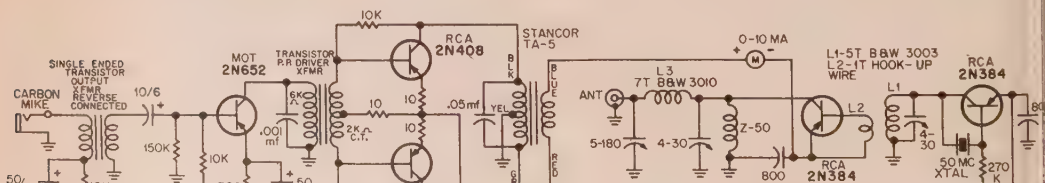


Fig. 2—The transmitter section of Mel's station. The driver stage is not critical and you can replace the 2N652 with a 2N109 or 2N217 if you have trouble locating the Motorola transistor. By feeding the emitter, you can ground the tuning capacitor and coil directly.

)C-170 at Vcb of -6 volts, the capacity is only .8mmfd. The base resistance is also very mall. The feedback base resistance of the)C-170 measured at 3 mc. is approximately 0 ohms.

W7MPQ's QRP Corner

This month our QRP news comes from Jim, ack and Jill. Just a coincidence, of course.

A suggestion for a QRP frequency comes ames V. Smith, K9MHU, of Marion, Indiana. m suggests 7145 kc. He says he has found open more often than other spots in the 40 eter band. Anymore suggestions from the rest f you QRP boys?

Jack Shaughnessy, K2TTC, of Hollis, N. Y., ys he has been on the air for the past year ith about 36 milliwatts and a Wonderbar ntenna. Jack has been on 10 meter phone, and as worked some 60 locals and has confirmaons from three out of town.

The best report on Jack's 36-mw. was an -8 from Boynton Beach, Florida, "Q5 all the ay through the QRM" on 28.72 mc. He has 20 watts on tap but has not had it turned n for a year! Also reminds us that he has no VI problems with the QRP rig-his only proem is finding someone on during TV hours.

K2TTC adds that he has worked 200 iles on 40 meters cw using a piece of wire ed to the tank of his wireless code practice g.

Jim Bodnar, W8UQZ, of Cleveland, Ohio, building a QRP transceiver. He is using a odified SSS (W6TNS) for cw and phone on), 15, and 20 meters. The receiver portion ill be W6TNS's two lunger with a change in e audio. He says the rig will be completely rtable, metered and tunable with xtal conol.

Jim needs ideas for QRP phone rigs (don't e all?). If our readers have any, please send em along and we'll send a copy to W8UQZ.

Semiconductor News

Bradley Semiconductor Corp., New Haven , Conn. are marketing a new line of miniare selenium diodes with a PIV range between and 296 volts. Low current type, though, e ma.

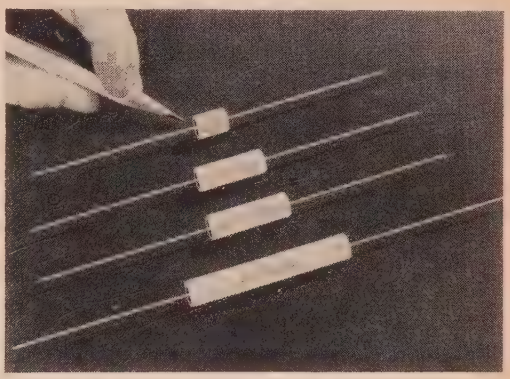
Fairchild Semiconductor Corp., 545 Whisn Rd., Mountain View, Calif. is reducing ices and expanding the MESA transistor line. eir 2N696 has a Vc of 40 volts, will disate 2 watts. As an *rf* amplifier, it has 17 *db* in at 30 *mc*, and as a power output stage, it ll deliver 1.5 watts at 20 *mc*. The price, in gle quantites is $28.50.

General Electric has published a 27 page oklet on their VAC-U-SEL selenium rectirs. You can obtain a copy by writing GE, niconductor Products, Liverpool, N. Y., and ing for ECG-402.

GE has also reduced the prices on silicon controlled rectifiers. Introduced a little over a year ago, they were priced at $210 each. Now the 16 ampere, 25 volt model sells for $23.00 each!

Also new from GE is a series of silicon transistors. The 2N332-6's are intended for audio, *rf*, and general switching. The 2N337-8 are intended for *rf* and high speed switching applications. Their 2N489-494 series are silicon Unjunction types. Bulletins ECG-356, ECG-339, and ECG-357, describe these units.

International Rectifier Corp., El Segundo, California, is marketing a new series of silicon rectifiers rated to 10,000 PIV (see photo). Designated types 1N2373 through 1N2381, they are incased in ceramic to prevent surface creepage and minimize flashover problems encountered at high altitudes. Bulletin SR-227 describes.



A new series of International silicon rectifiers are rated from 600 volts to 10,000 volts PIV; 75 to 250 ma.

Also new from International, is their low-cost 25 to 35 ampere stud mounted silicon rectifiers. They are available with PIV's between 50 and 500 volts. Price ranges between $5.50 and $16.00 each. Bulletin XSR-310 describes these units.

Motorola, Inc. Phoenix, Arizona, claims to be the world's largest manufacturer of power transistors, with 350 million transistor-hours of experience. They certainly make a complete line. As an example, their 2N630 switching transistor has a Vc of 110 volts and will dissipate 50 watts at 30° *C*. They are going on Zener diodes also. Their 1 watt, 1.5 watt, 10 watt, and 50 watt series contain 44 diodes each!

Philco Corp., has a new transistor in the works. It is described as a 3,000 *mc* MADT type, designed for direct insertion into coaxial lines. A 22 *db* gain with 4 *db* noise figure at 200mc. is claimed. As a power amplifier, it will deliver 10-20 *mw* at 1,000 *mc*

RCA is now sampling their diode-triode transistor, experimental type No. TA-1764A. It can be used as the diode detector/first audio

PROPAGATION

George Jacobs, W3ASK
607 Beacon Road, Silver Spring, Md.

September's Highlights

Daytime maximum usable frequencies will *rise* considerably during September, with a sharp increase in *10-meter* openings to all areas of the world. While night time maximum usable frequencies will begin to *decline* during the month, *20-meters* is still forecast as the band in which long-distance propagation conditions will be optimum during the hours of darkness. Seasonally lower static levels will result in a general improvement in conditions on the *40, 80 and 160-meter* bands, especially during the hours of darkness.

Last Minute Forecast

"There is generally an increase in ionspheric storminess during September. A moderate to severe storm is forecast for September 17-19, with the possibility that several other storms of less intensity may occur during the month. A period of good propagation conditions is expected to occur between September 5th and 7th."

Sunspot Cycle

The Zurich Solar Observatory reports a rel tive monthly sunspot number of 168 center on June, 1959. This results in a smoothed su spot number of 178.8 centered on Decembe 1958. The present solar cycle continues to d crease, but at a very slow rate. This montl forecast is based upon a predicted smooth sunspot number of 142.

Contest Special

Next month's column will be devoted entire to a special propagation forecast for the Pho Period of the CQ World-Wide DX Contest.

73 Geor

SYMBOLS FOR NUMBER OF DAYS CIRCUIT PREDICTED TO OPEN:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) over 26 da

** Indicates time of possible six-meter openings.
* Indicates time of possible eighty-meter openings.

On the Short-Skip Chart the first symbol in the parenthesis applies to the shorter distance while the second symbol applies to the longer distance for which the forecast is made.

The CQ DX Propagation Charts are based upon a radiated CW power of 15 watts at radiation angles less than thirty degrees and are centered on the Eastern, Central and Western areas of the USA. They are valid through October 15, 1959. The Short-Skip Chart is based upon a radiated CW power of 75 watts, using a dipole antenna a half-wave length above ground. It is valid through October 31, 1959. These forecasts are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

Semiconductors

stage in receivers. The manufacturing process results in far less circuit components.

RCA has jumped on the MESA bandwagon by introducing two low-cost types for commercial and military data-processing systems. The 2N1300 and 1301 have gain-bandwidth products (figure of merit) of 40 and 60 mc. respectively.

A new booklet, titled *RCA Semiconductor Products*, looks and sounds like a catalogue. But don't be fooled! It contains simple transistors theory, an interchangeability directory, and many interesting circuits-including a complete short wave receiver, a powerconverter, a 75 *mc* receiver, and many others. The price is 30 cents at your local RCA distributor.

Sarkes Tarzian Rectifier Div., 415 N. College Ave., Blooington, Ind., have silicon plug-in replacements for the 5U4 type rectifier, and the troublesome 6 X 4. Ask for design notes No. 36 and No. 37.

Sylvania is offering a sampler pack of high stability switching transistors. The package, which sells for $72.95 contains three each of the companies six most popular NPN types and eight-page booklet listing specifications a ratings.

The latest issue of Sylvania News conta an interesting discourse on TV tuner appli tions of 1o Z crystal diodes.

Triad Transformer Corp., 4055 Redwo Avenue, Venice Calif. has developed a n series of transformer for transistor power s plies (not power converters). They prov output voltages of 40 *ct* 20, and 10 a.c. T F-90X will deliver 100 ma., the F-91X produ 300 *ma,* while the F-92X is good for an amp

The price of the Texas Instruments 2N1 (Fco-480 *mc*) has been further reduced $16.00. It is good for 100 *ma* max., and — volts max. The dissipation rating is 750 TI's Applications Notes Vol. 1, No. 1 conta an interesting discussion of bias networks silicon tetrodes.

That is about all the new transistor n for this month. Don't forget the QRP news Dick, and to send any circuits of interest hams to yours truly.

73, De, W6

SEPTEMBER, 1959

All Times in E. S. T.

ASTERN USA TO:

	6**/10 Meters	15 Meters	20 Meters	40/80* Meters
estern Europe	7A-9A (1) 9A-2P (3) 2P-5P (2)	6A-10A (3) 10A-2P (2) 2P-4P (4) 4P-8P (2) 8P-9P (1)	7A-10A (1) 10A-1P (2) 1P-3P (3) 3P-7P (4) 7P-9P (3) 9P-7A (2)	5P-7P (1) 7P-2A (3) 8P-2A (2)*
outhern Europe North Africa	6A-8A (1) 8A-10A (2) 10A-2P (4) 2P-6P (2)	6A-8A (3) 8A-1P (2) 1P-5P (4) 5P-9P (2) 9P-10P (1)	7A-12N (1) 12N-3P (2) 3P-8P (4) 8P-11P (3) 11P-7A (2)	6P-8P (2) 8P-12M (3) 12M-2A (2) 8P-12M (2)*
astern Mediterranean	6A-8A (1) 8A-12N (2) 12N-2P (1)	6A-11A (1) 11A-3P (2) 3P-6P (1)	12N-3P (1) 3P-5P (2) 5P-11P (3) 11P-4A (1)	6P-11P (2) 8P-10P (1)*
entral & outh Africa	8A-10A (1) 10A-2P (2) 2P-5P (4) 5P-7P (1)	7A-12N (1) 12N-3P (2) 3P-6P (4) 6P-9P (2) 9P-11P (1)	2P-6P (2) 6P-9P (3) 9P-2A (2) 2A-5A (1)	6P-11P (2) 7P-10P (1)*
outh America	10A-2P (1)** 5P-9P (1)** 7A-2P (3) 2P-6P (4) 6P-8P (2) 8P-10P (1)	6A-9A (3) 9A-3P (2) 3P-8P (4) 8P-11P (3) 11P-2A (2)	7A-3P (2) 3P-7P (3) 7P-1A (4) 1A-7A (3)	8P-3A (3) 3A-6A (2) 9P-3A (1)*
hilippine Is. East Indies	4P-7P (1)	8A-11A (1) 4P-8P (2) 8P-10P (1)	6A-9A (2) 8P-2A (1)	Nil
ustralasia	9A-11A (1) 4P-7P (3) 7P-9P (1)	8A-10A (2) 10A-4P (1) 4P-6P (2) 6P-9P (3) 9P-11P (1)	6A-9A (3) 9A-11A (2) 11A-8P (1) 8P-11P (2) 11P-2A (3) 2A-6A (2)	3A-4A (1) 4A-6A (2) 6A-8A (1) 4A-6A (1)*
uam & Pacific	3P-5P (2) 5P-7P (1)	9A-11A (1) 5P-8P (2) 8P-10P (1)	6P-9P (1) 9P-2A (2) 2A-6A (1) 6A-8A (2) 8A-10A (1)	10P-3A (1)
apan, Okinawa Far East	4P-7P (2)	7A-10A (2) 10A-3P (1) 3P-5P (2) 5P-8P (3) 8P-10P (1)	6A-9A (3) 9A-11A (2) 11A-5P (1) 5P-8P (2) 8P-11P (1)	Nil
alaya & South- ast Asia	2P-5P (1)	7A-10A (1) 3P-5P (1) 5P-7P (2) 7P-9P (1)	6A-9A (2) 5P-10P (1)	Nil

ALL TIMES IN C. S. T.

ENTRAL USA TO:

	6**/10 Meters	15 Meters	20 Meters	40/80* Meters
estern & entral Europe	8A-10A (1) 10A-1P (3) 1P-4P (1)	6A-12N (2) 12N-3P (3) 3P-5P (2) 5P-7P (1)	12M-8A (1) 8A-2P (2) 2P-7P (4) 7P-9P (3) 9P-12M (2)	6P-12M (2) 8P-1A (1)*
outhern Europe North Africa	7A-9A (1) 9A-11A (2) 11A-2P (3) 2P-4P (1)	5A-7A (2) 7A-12N (1) 12N-4P (4) 4P-7P (2) 7P-9P (1)	8A-2P (1) 2P-4P (3) 4P-7P (4) 7P-10P (3) 10P-8A (2)	6P-12M (2) 8P-12M (1)*
ntr l & South rica	8A-10A (1) 10A-2P (2) 2P-4P (4) 4P-6P (1)	7A-12N (1) 12N-2P (2) 2P-5P (4) 5P-9P (2) 9P-1A (1)	12N-2P (1) 2P-6P (2) 6P-9P (3) 9P-1A (2) 1A-5A (1)	6P-10P (2) 7P-9P (1)*
ntral & South nerica	10A-1P (1)** 5P-9P (1)** 7A-2P (3) 2P-5P (4) 5P-9P (2) 9P-11P (1)	6A-9A (3) 9A-2P (2) 2P-8P (4) 8P-11P (3) 11P-2A (2)	1A-8A (3) 8A-2P (2) 2P-5P (3) 5P-1A (4)	7P-2A (3) 2A-6A (2) 8P-2A (1)*
apan, Okinawa Far East	3P-7P (2)	6A-9A (2) 9A-2P (1) 2P-6P (3) 6P-8P (2) 8P-10P (1)	6A-9A (3) 9A-11A (2) 11A-5P (1) 5P-8P (2) 8P-12M (1)	1A-6A (1)
alaya & South- st Asia	1P-3P (1) 3P-6P (2)	9A-4P (1) 4P-7P (2) 7P-9P (1)	6A-9A (2) 5P-10P (1)	Nil
waii	11A-2P (2) 2P-6P (4) 6P-8P (2) 8P-9P (1)	8A-2P (3) 2P-10P (4) 10P-2A (2)	9A-4P (2) 4P-8P (3) 8P-2A (4) 2A-9A (3)	10P-1A (2) 1A-7A (3) 2A-6A (2)*

SEPTEMBER, 1959

All Times in CST (contd)

CENTRAL USA TO:

	6**/10 Meters	15 Meters	20 Meters	40/80* Meters
Australasia	7A-9A (1) 2P-4P (2) 4P-7P (3) 7P-9P (2)	7A-10A (2) 10A-3P (1) 3P-5P (2) 5P-10P (3) 10P-1A (2)	1A-6A (2) 6A-9A (3) 9A-12N (2) 12N-7P (1) 7P-10P (2) 10P-1A (4)	2A-7A (2) 3A-6A (2)*
McMurdo Sound, Antarctica	12N-2P (1) 2P-6P (2) 6P-8P (1)	1P-3P (1) 3P-6P (2) 6P-9P (3) 9P-11P (1)	1P-4P (1) 4P-6P (2) 6P-9P (3) 9P-1A (2)	7P-9P (1) 9P-2A (2) 2A-5A (1) 9P-1A (1)*

ALL TIMES IN P. S. T.

WESTERN USA TO:

	6**/10 Meters	15 Meters	20 Meters	40/80* Meters
Europe & North Africa	7A-9A (1) 9A-11A (2) 11A-1P (1)	6A-9A (1) 9A-12N (3) 12N-4P (1)	7A-1P (1) 1P-3P (2) 3P-6P (3) 6P-11P (2) 11P-2A (1)	6P-11P (1) 7P-10P (1)*
Central & South Africa	7A-9A (1) 9A-12N (2) 12N-3P (3) 3P-5P (1)	5A-8A (1) 8A-10A (2) 10A-3P (3) 3P-6P (1)	9A-1P (1) 1P-5P (2) 5P-9P (1) 9P-12M (3) 12M-3A (1)	6P-10P (2)
South America	8A-1P (1)** 5P-8P (1)** 7A-12N (2) 12N-4P (4) 4P-7P (2) 7P-10P (1)	12M-10A (2) 10A-12N (1) 12N-2P (2) 2P-6P (4) 6P-12M (3)	12M-5A (3) 5A-8A (2) 8A-2P (1) 2P-4P (2) 4P-12M (4)	6P-8P (2) 8P-11P (3) 11P-5A (2) 7P-1A (1)*
Guam & Mariana Islands	12N-4P (2) 4P-7P (3) 7P-9P (2)	7A-10A (2) 10A-12N (3) 12N-4P (2) 4P-7P (1) 10P-1A (1)	9P-11P (1) 11P-2A (3) 2A-6A (2) 6A-9A (3) 9A-11A (2)	12M-5A (2) 2A-4A (1)*
Australasia	9A-1P (2) 1P-5P (3) 5P-7P (4) 7P-9P (2)	7A-12N (2) 12N-4P (1) 4P-8P (2) 8P-12M (4) 12M-4A (2)	8P-10P (2) 10P-3A (4) 3A-6A (3) 6A-9A (2) 9A-12N (1)	10P-12M (1) 12M-4A (3) 4A-6A (2) 12M-5A (1)*
Japan, Okinawa & Far East	12N-4P (2) 4P-7P (3) 7P-9P (2)	7A-11A (3) 11A-7P (2) 7P-11P (3) 11P-1A (2)	9P-12M (2) 12M-3A (3) 3A-6A (2) 6A-9A (3) 9A-12N (2) 12N-9P (1)	12M-6A (3) 1A-5A (1)*
Philippine Islands & East Indies	8A-2P (1) 2P-4P (3) 4P-9P (2)	7A-10A (3) 10A-2P (2) 10P-12M (1)	10P-1A (1) 1A-4A (2) 4A-8A (3) 8A-10A (2) 10A-12N (1)	3A-7A (1)
Malaya & South- East Asia	11A-3P (1) 3P-6P (2) 6P-9P (1)	7A-11A (3) 11A-4P (2) 10P-12M (1)	12M-4A (1) 4A-8A (3) 8A-12N (2) 12N-2P (1)	3A-7A (1)
Hong Kong, Macao & Formosa	12N-4P (2) 4P-7P (3) 7P-9P (2)	8A-12N (3) 12N-9P (2) 9P-11P (3) 11P-1A (2)	10P-2A (2) 2A-8A (3) 8A-12N (2) 12N-10P (1)	2A-6A (2) 3A-5A (1)*

September-October, 1959

CQ Propagation Chart (Short-Skip)

Band (Meters)	DISTANCE (Miles) 50-250	250-600	600-1200	1200-2200
10	---	---	8A-11A(0-1) 11A-5P(1-2) 5P-8P(0-1)	8A-11A(2-1) 11A-5P(3-2) 5P-8P (2)
15	---	8A-12N(0-1) 12N-4P(0-2) 4P-8P(0-1)	8A-12N(1-2) 12N-6P(2-3) 6P-10P(0-1)	8A-12N (2-3) 12N-5P(3-4) 5P-9P(2-3) 9P-12M(1-2)
20	---	8A-1P(1-2) 1P-6P(1-3) 6P-8A(0-1)	6A-11A(2-4) 11A-6P(3-4) 6P-9P(1-2) 9P-12M (1)	8A-2P(4-3) 2P-11P (4) 11P-8A (2)
40	6A-9A(2-3) 9A-7P(4-5) 7P-10P(3-4) 10P-6A(1-2)	7A-10A (4) 10A-4P(4-3) 4P-12M (4) 12M-7A(2-3)	8A-6P(3-2) 6P-11P (4) 11P-5A(3-4) 5A-8A(3-2)	4P-7P (2) 7P-5A (4) 5A-10A(2-1) 10A-5P(2-0)
80	6A-11A(5-3) 11A-6P(4-2) 6P-12M (5) 12M-6A (4)	9A-5P(2-1) 5P-7P(3-2) 7P-5A(5-4) 5A-9A(4-2)	5P-7P(2-1) 7P-4A (4) 4A-7A(3-1) 7A-9A (1)	6P-8P (1) 8P-5A(4-3)
160	5P-7P(3-2) 7P-7A (5) 7A-9A(3-2)	6P-8P (2) 8P-5A(5-4) 5A-7A(4-2) 7A-9A(2-1)	7P-10P (2) 10P-3A(4-3) 3A-6A(2-1)	10P-5A(3-1)

YL

by Louisa B. Sando, W5RZJ
212 Sombrio Drive, Santa Fe, N.M.

3rd International YLRL Convention

Last month we gave you the dates—June 17-19, 1960. Now we hear from the Convention Committee of WRONE that they have chosen the site—the Hotel Commander in historic Harvard Square, Cambridge, Mass. Convention activities will be held in the Ballroom of the Commander and the Hotel is providing a double suite as a hospitality spot for the YLs from Friday noon until Sunday. The Commander also is giving the YLs the privilege of reserving rooms on one floor, provided reservations are made by May 1, 1960, through the reservation committee. Rates at the hotel are: Single with bath $8; double or twin with bath, $15.

Here are the convention committees as they have been set up:

General co-chairmen—Mildred Doremus, W1SVN; Onie Woodward, W1ZEN
Favors & decorations—Blanche Randles, K1IZT; Edith Shaughnessy, W1ZJS
Program—Ruthe Ferguson, W1SCS
Publicity—Marjorie Snow, W1VOS
Reservations—Eunice Gordon, W1UKR; Jean Peacor, K1IJV
Sunday entertainment — Helen Harris, W1HOY; Edith MacCracken, K1EKO
Ye Olde WRONE Gift Shoppe—Mary Hinterland, W1CEW

The committee also has set prices of regist tion for the YLRL Convention: YL's-$10 (t includes coffee break, luncheon and banqu all on Saturday) OM's-$5 (this is for banq only on Sat.) These prices seem very reas able. The $10 YL registration is the same that charged at the First International YL Convention held in 1955—and you know w has happened to prices since then! The spons ing group, WRONE, will be grateful for items individuals (YL or OM) might care donate for convention prizes.

YL "Howdy Week"

W6DXI, Gladys, YLRL's V.P., has nounced a new contest for YLs. Dates are S 27 through Oct. 3. To be known as "Hou Week," this is a contest for YLs only. Th rules apply:

1. Score will be based on YL contacts only.
2. All bands and all modes of emission may be used
3. Only one contact for a call may be claimed.
4. No multipliers.
5. Contest opens 1200 EST Sunday Sept. 27 an closes 1200 EST Saturday Oct. 3.
6. Scoring: 2 points for YLRL member; 1 poin for non-member YL.
7. Logs not required. Submit a list stating date time, call, name, QTH, YLRL member or not.
8. Awards: Top YLRL member score—choice o pin or YLRL stationery. Top non-membe score—one year paid membership in YLRL

Mother and daughter Hams, Winnifred Cox, K7BKH (left), and 20-year old Eileen, K7BFJ.

9. Score sheets must be received by V.P. by Oct. 24.
10. Submit scores to: Gladys Eastman, W6DXI, 735 Glen Ave., Glendale 6, Calif.

11th National Convention

GAYLARKs did themselves proud in carrying out the licensed YL program under leadership of retiring club president W5EGD, Lillian, at the National Convention at Galveston June 19-21. Over 70 YLs attended the YL breakfast, with a total of 90 registering for the convention. Speakers at the YLRL Forum during the breakfast hour were W1QON, Eleanor, YL Editor of QST; W6DXI, Gladys, V.P. of YLRL and president-elect for 1960; K5IMD, YLRL 5th D/C. Late Sat. K4LMB, Ethel, who founded YLRL in 1939 (then W7FWB), arrived from D.C. to help celebrate the 20th anniversary of YLRL. At the Convention Center the YL booth displayed YL certificates from all the YL clubs and those offered by YLRL, as well as pictorial posters and certificates together with QSLs and correspondence from YL clubs from each continent. Betty, W5ERH, and OM W5KFD prepared this booth. In the GAYLARK Hospitality Room, in charge of K5BJU, Harriett, a collection of scrapbooks and photo albums from various YL clubs was displayed.

With the Clubs

The San Diego YLRC is offering a "Missions to Missiles" certificate for working 7 members of the club after June 1, 1959. QSL cards are not required. Submit log information with complete entries—signal reports, frequency, date, time, QTH and handle. Enclose 25¢ for handling. Custodian is W6GGX, Pat Muelheim, 4275 Del Mar Ave., San Diego 7.

GAYLARK is losing the club president and secretary—W5EGD's OM, W5DIW, has accepted a promotion with the FCC in Baltimore, Md. K5SPD's OM, K5OEA, has been transferred to Md. by the Navy. Taking over the president's position for the remainder of the year is K5PFF, Audrey Beyer.

At their June meeting LARK elected these officers: Pres., K9IVG, Roberta; V.P., W9UON, Connie; secy, W9IWP, Mardene; trea., K9BWJ, Mary Alice; Novice rptr., K9HGY, Bev; P/C, K9IWR, Marilyn; *Pinfeather* editor, W9MYC, Gladys.

W4BIL, Fran and W4TDK, Naomi, are getting out a Floridora YL Directory and history with help of W4HRC, Little Bo.

Another mother-daughter team are 9-year old Peggy, WV2EEC, and Ann Zmetronak, WV2EEB. 4½-year old Cynthia's interest so far is in QSL cards.

Congratulations

To YLRL President W4BLR, Kay, and OM, W4BVB, on arrival of Sharon Faye on June 7. To K6LVE, Zona, and OM on arrival of Terri Lynn on June 10. To Maxine, WA6BQV (ex-W5YRT), and OM on arrival of Otis Leslie (their 4th boy!) on June 11.

Congratulations also to W6UXF, Enid Aldwell, on graduating with honors from UCLA with a B.A. and election to Phi Beta Kappa. This, just 30 years after graduating from high school! Enid majored in German at UCLA, which ties in with her hobby of German and Austrian folk dances and custumes. Graduation present from her OM, W6ZD, was a trip to Europe where she planned to do research preparing for a Ph. D. in German. Enid also enjoys making hand-loomed fabrics from which she fashions her own clothes, and she plays an electric organ.

Congratulations again—to KH6BTX, Gladys, and KH6AUJ, Dotty, on earning W.A.Z. And to K2MGE, Dorothy, who earned WPX, certificate No. 6 on SSB, the first YL to do so.

Our condolences to W7FWR, Mary Ann, whose OM, W7FWD, has joined the Silent Keys. . . . We also were sorry to hear of the passing of VE3DMX, Della O'Shea. She was 1958 VE D/C for YLRL.

Mother/Daughter YLs

The mother/daughter YL team of Verla (better known as Eileen), K7BFJ, and Winnifred Cox, K7BKH, should include father and OM, Verlon, K7AEZ, who started them on the way to Ham radio. Winnifred had bought a book on the subject but it lay on a table for months. Then one night Verlon picked it up, became intensely interested and all began studying code and theory. They all got Novice tickets in 1957 with Conditional licenses following in Jan. and March of '58. They are active on all bands with all methods. On ssb they use a Pacemaker exciter for the "500"; they also work RTTY.

Back in 1928 Winnifred had polio and for two years had limited contact with the world. The family took up hobbies together; photog-

[*Continued on page* 100]

by DONALD L. STONER, W6TN
P.O. Box 137, Ontario, Cali

Novice

The time has arrived to once again "harp" on the subject of QSL Bureaus. The mail this month contains several letters on the subject.

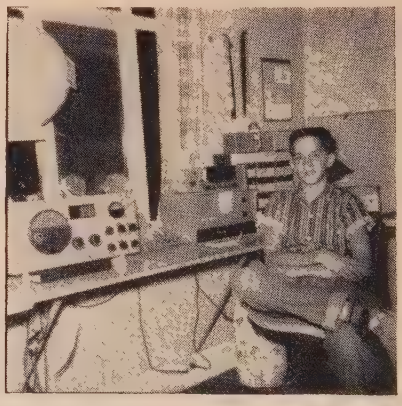
In case you missed it in earlier columns, here is how the QSL Bureau works . . . you send a stamped and self addressed envelope, with your call printed in the upper left hand corner, to your QSL Manager. He will then place it in his file, in order of calls, and when a few cards arrive for you they will be inserted in the envelope and mailed. When you receive the pack of cards you mail another SASE to the bureau and the process repeats.

You can send W/K cards through the ten bureaus, but Novice cards are usually frowned upon. The reason is simple. Generally, one out of 50 Novices will file an envelope with the manager. These unclaimed cards will set around the bureau for years before they are thrown out. The bureau managers handle the cards as a service to fellow hams, it should be pointed out, and are not paid for their efforts. Even if they could afford to buy stamps for all those unclaimed cards, the addressing job would be monumental!

Any Novice interested in working DX should have an envelope on file in the bureau, to receive foreign QSL and SWL cards. You can understand that most DX stations cannot afford to mail a card directly for each contact, even by surface mail. Most of your DX cards will come through the bureau. When the DX station has a sufficient number of cards made out, he will make up a bundle and send them to the ARRL, or send ten bundles directly to the QS bureaus. There they will be sorted out ar placed in the correct file.

If, as soon as you finish reading the colum you would send a SASE to your bureau it wou relieve considerable congestion. Here are th QTH's for the ten bureaus:

W1—Geo. L. DeGrenier, W1GKK, 1C Gallup St., N. Adams, Mass.
W2—N. New Jersey DX Assoc., Box 5 Arlington, New Jersey.
W3—Jesse Bieberman, W3KT, Box 4C Bala-Cynwyd, Penna.
W4—T. M. Moss, W4HYW, Box 64 Municipal Apt. Branch, Atlant Ga.
W5—Robt. J. Stark, Box 261, Grapevin Texas.



Gee, I just worked a new one says Bob Harler, KN8MWO, 214 Grant Ave., Moundsville, W. Va. Bob is pleased over his WAS of 80/29 with his Globe Chief 90A and SX-43. He operates 80 and 40 and would like skeds with states in the 7th call area.

W6—Horace Greer, W6TI, 414 Fa mont Ave., Oakland, Calif.
W7—Salem ARC, W7SAA, 363 Cou St., N. E., Salem, Oregon.
W8—Walter Musgrave, 1245 E. 187 St., Cleveland 10, Ohio.
W9—Julian F. Oberg, W9DSO, 26 Gordon Dr., Flossmoor, Ill.
WØ—Alva A. Smith, WØDMA, 238 Main St., Caledonia, Minn.

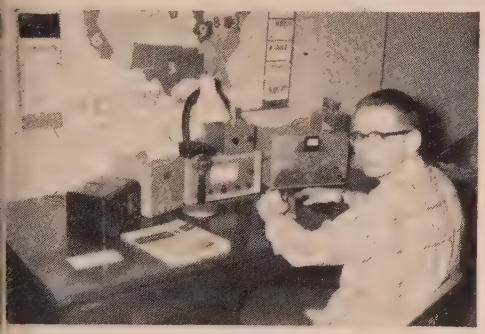
Our DX editor, Urb LeJeune, W2DEC, sa that his club handles the W2 cards and th

The rare state of Maine is represented photographically by Howard Feldman, KN1KAT, 49 Western Prom., Auburn, Maine. Howard is located near Portland and will sked anyone needing his stage. There should be no problem for he has separate antennas for each Novice band

ave slug of Novice cards. Maybe yours is ere.

Some time ago there was a series of Novice SL bureaus. However, I have been unable to id any trace of them in any of the magazines in the call book. In theory the Novice QSL ireau is a terrific idea for we have problems ot encountered by the General Class ham. Few ovices can afford to purchase a call book $5.00), and those that can find that they are veral months behind. By the time you find a iaps' QTH, his call may have already expired-. I personally would like to see a strong net-ork of Novice QSL bureaus. If some of you ading this are handicapped, or have lots of are time, let me know. If you can work out mething, I will be glad to assist.

An Unusual Novice Station — Rev. Dave hambers, KN7HLP, is a protestant minister the Hanasupai Tribe, located in Supai, Ari-na. Supai is in a 3,000′ "hole" and can only

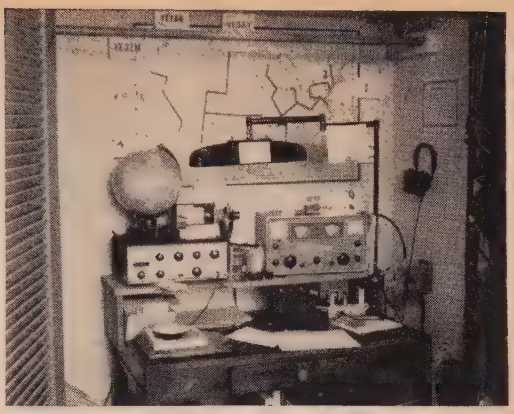


This is the neat station of Robert Durdle, K8HJI, 2457 W. River Dr., in Grand Rapids 4, Mich. Bob has several pieces of home brew gear to improve the existing station equipment. He still likes c.w. and spends most of his time on 40, but likes to rag chew and will sked for any reason. Bob would like to sked someone in La., N. Mex., Utah, and KL7- KH6 land.

reached by an eight mile trail—on horse-ck. The nearest paved highway is US-66, hich is 63 miles of crude dirt road from the d of the trail. Dave had his rig packed in dur-g June along with a 2.5 kw. power-plant. He ds his DX-40 and SX-71 to a 15′ dipole.

According to the National Geographic, the nasupai is possibly the smallest and most lated Indian reservation in the U.S., since it located in the Grand Canyon. Supai has a iool, church, and hospital. Thanks to Evalyn Ewing, KN5TXQ, 526 Seneca Tr., Shreve-rt, La., for supplying this interesting informa-n on KN7HLP's station.

Dick Carruthers Jr., KN7HDB, Warrenton, egon, advises us that his state is having a ntennial. The Oregon Hams have a centennial b going and are issuing a terrific certificate working 100 Oregon hams. Actually if you e some distance from the state, a formula is d that requires less than 100 contacts (the ther, the less contacts required). If inter-



The photo of Dick Carruthers Jr's (KN7HDB) stations is real clear, too bad they are not all this good! As you can see, Dick (QTH listed at beginning of column) has the Eico transmitter kit which he says "is a real gem." He constructed his own 15 meter beam out of TV mast and conduit. Sounds like a beauty, Richard.

ested in earning this certificate, write Dick—He's the Chairman—at P. O. Box 1231, in Warrenton.

Who's DX?

Band conditions must be excellent, judging from the number of reports from all over the globe.

Ever faithful Tima Popovic, YU1-RS-357, Banat Novo Selo, Yugoslavia, received the following stations during the month of June. As usual, all times are in GMT: 12th: 1845-2300: KN1HTQ, WV2DFV, FGQ, KN3IAO, KN4AWM, CQS, DXN, GHG, HDQ, OPV, RTM, KN5SNE, TFH, ULJ, USE, KN8NST, ODK, OGB, KN9OIU, QEQ, RDK, RDY, SHT, KNØSVW. June 13, 0415-0535: WV2DRK, ECG, WP4AQB, ARR, KN4BOI, GNM, VYC, YVO, KN5SJB, SJN, SLW, TOB, TON, VTZ, KN8MJN, KNØTLE. The 14th, 2145-2215: KN1JGM, KTH, WV2CHK, CWY, KKN3HKC, HPZ, HWT, KN4FRI, FYY, GGX, KN8BOI, OJB. The 15th, 0350-0520: KN1KJH, KN4AGM, WP4AQT, KN4BZC, DXD, EQW, FJR, EQU, FSK, FVA, FZI, HGV, YRL, ZRH, KN5STA, TST, UBM, VAZ, ZRS, WV6CVM, KN7GGL. June 16, 0335-0400: WV2CSH, KN4AFT, IID, WV6EOM. June 26, 0300-0420: KN3HPG, KN4ARR, DXB, EDF, ESK, FJW, FUD, FVN, FYI, GVM, GXD, HDL, HDR, HPG, HQI, HTU, IBW, ILY, JKC, NXD, KN5RUI, SCR, SCT, TCD, UAW, UHP, UQT, VMX, KN8NCJ.

Ken Bale, received call EL4A, and is operating at Letournea, Liberia. Ken reports hearing the following Novice stations in West Africa: May 30, 0430-0500 GMT: KN1JJA, KN3HYC, LOW, KN8KUH, NWR. June 6, 0530 GMT: KN4FNO (569), KN5TOR, UWN, KN8LIM (579), KN9SKB (579). June 11, 0445 GMT: KN1KCB, WV2ERC,

KN3HJC, KN5SUT, KN8BHL.

George Haylock, G2DHV, reports reception of the following stations in London, England, during April: KN1GMI, GNX, IYM, KN2LOK, UMU, WV2DXA, KN3HUA, KN4YAZ, WP4AQT, KN5SGE, WV6BJR, KN8KNR.

A new correspondent, Jimmy Briler, Tuslog, Det. 28, A.P.O. 324, N.Y., N.Y. writes of Novices heard on 21 mc., on June 14, between ØØØØ and 0130 GMT: KN4AWM, COF, CLS, FOM, HDR, EDF, RFL, BWS, KN5SUR, TOB, WV6CUV. You fellows can be mighty proud, for Jim is located in Istambul, Turkey! By the way, Jim would like to correspond with OM and XYL hams, as it gets pretty lonesome over there.

Last, but by no means least, a report from Ivor Stafford, VK3XB, 16 Byron St., Box Hill Sh., E 11, Vicgoria, Australia. The following stations were received on the 40 meter novice band: May 18, KN5UCN, WV6AWZ, VNI, KN8LQA. May 20, KN4BYQ, EPJ, KN5RVU, UQT, WV6AIT, CUO, BJP, WH6DBY, WV6DEH, EHQ, KN8OIH. May 24, KN4AFI, WV6CMX, CQV, DCU, DOS, EIK, FKH, KN7CHJ, HRW, HUE, KN8OEJ, ORC, OTO. May 25, KN4FTZ, May 27, KN5UCN, WV6FAX, KN7EOD, KN8OIH. May 28, KN3IJF, KN4GLL, WV6CCN, KN7HRW, KNØTUV. May 29, KN3FAQ, KN4FXF, KN5TOR, KN9RUV. May 30, WV2ERI, KN5RVD, KN5SNI, UCN, UZG, KN8MGV, OIH, KN9RTB. May 31, WV2CSN/1, KN3ICP, KN4AFI, BYQ, FXF, YTO, ZSX, KN5STD, WV6BXD, WH6DBY WV6DIF, DQS, KN7GHJ, HUE, LQE, KN8LQE, OOS, OTO, KN9QCR, KNØRQG, TGA. June 1, KN3HFB, KN4FXF, GLL, WV6LPA, KN8OTO, KN9QCR. June 2, KN3HWR, June 4, KN1IQP, WV2CVW, KN3IDQ, KN4AFI, YTO, KN8WWL. June 5, KN7IAY, KN8MNF. June 6, KN4AFI (wadda pipeline!), FLV, YTO. June 7, KN3HSD, HSI, KN4BYQ, FIW, KN5SAY, SND, UQC, UZY, WV6CSO, DPE, KN7HRW, KN9RWP.

Net News

Michael Stephenson, KN3GXP, 360 Forest Avenue, Ambler, Pa., says that the Lakeland Slow Speed Net meets at 1700 EDST, Monday, Wed., and Fri., on 3701 (bit close?). The net control station is WA2AKK and K2UTV. All Novices and Generals are invited to "drop in."

Sandy, KN7HXP, 5202-101st St., S.W., Tacoma 99, Washington would like to start a net on 80 or 40 around 1600 PST. Prospective members, of those with advice, are invited to write him or call JU 8-8995.

Helping Ham

Anyone in the Cleveland area that would like help with the Amateur Exams is welcome to contact the Radio Transmitting Communications Organization, 1542 Wyandotte R Columbus 12, Ohio, or to phone HUdson 1698.

The following people would like help w the exams:

W5—Sandra Wingate, 801 South Meku key, Wewoka, Oklahoma.

W8—James Murphy, 6681 West 6 M Rd., Northville R#2, Mich.

W9—Glenn M. Bryant, 317 W. Ada Taylorville, Ill.

WØ—Robert J. Nobis, Jr., 1316-13½ No., Moorhead, Minnesota. Phone CE 3-55

Letters

Some time ago, I wondered who was the f Novice to work the Antarctic. Looks as i opened a "Pandoras' Box." The latest letter the subject is from Jimmy Hamm, K5K (Ex-Novice), 206 Agee Ave., N. W. Camd Arkansas. Jim says "on Oct. 19, 1957 I wor VP8CR, Leslie W. Barclay, Royal Society ternational Geophysical Year Expedition Hayley Bay, Coats Land, Antarctica. My rep was 559 and his signal varied between 479 589. My power input was pushing 50 watts. Jimmy the first?

Theodore Bell Jr., KN9OWC, 4841 Lawrence Ave., Chicago 15, Ill., cranks on w a Globe Chief 90A and an SX-100 into a "slanted dipole." The WAS total rests at 20/ Ted would like to obtain information of h to jack-up the power output of his rig, possi by replacing the 807 for a 6146. Can any help him?

Dwight Allen, 389 Bradley Rd., Bay Villa Ohio, is an almost Novice, but is confined SWL'ing at the moment. He comments that has trouble finding signals slow enough to c (a common trouble!).

Paul Roach, KN9RIY, R.R. #1, Junct City, Wisconsin, is 30 and has three childr When reading the reports of DX and WAS, wonders how you "young fellows" do it. P shouldn't have any trouble for he comes on w a Viking "Challenger" and Hallicrafters S- Paul has an unusual antenna made from ohm line. No, the system you are using is C Paul.

Dick, KN9SSB (wadda call!) 1920 Fa Ave., Green Bay, Wis., uses a homebrew tra mitter with his AR-3 and QF-1 to a 100′ "l wire." Dick has piled up 85 contacts in alm four weeks of operation, and has picked up states (worked).

Ken Anderson, KN8MTK, Box 710, F born, Ohio, is 16 and has worked 47 states about 6 months of operation, with his A and DX-40. Ken needs Nevada and Verm to complete his WAS. He will sked any needing Ohio, on 40 meters, and will be glad help prospective Novices.

Bill Dorgeloh, Jr., WV2ATH, 2C JRC Lane, Rutherford, N. J., is 13 and has wor

[*Continued on page 103*]

URBAN Le JEUNE Jr., W2DEC
416 North 15 St., Kenilworth, N.J.

DX DX DX DX DX DX DX DX

The following certificates were issued between June 15th and July 15th, 1959:

WAZ

#1080 4X4KK, Micky Monastirsky-Minzari
#1081 JA1CC, Akira Asano
#1082 DL6OS, Karl Dunkelmann
#1083 JA1GC, Keiichi Ishizuki
#1084 W5WZQ, David R. Blaschke
#1085 K6TXA, Robert Carlson
#1086 JA1BF, Yoshio Suzuki
#1087 K9ECO, Richard Roessler
#1088 G8UG, Jack K. Coomber
#1089 W7CSW, Ryder W. Chronic
#1090 W8JSU, Charles C. Miller
#1091 VE7ZK, Herb H. Trips
#1092 W1WDD, Peter C. Card
#1093 WØBSK, Gene Heck
#1094 KA2NY, Mike and Key Club (Yokosuka, Japan)
#1095 W6FLT, W. R. Stangel
#1096 W9WCE, John G. Kuespert
#1097 F9ER, Raoul Ortuani
#1098 OH2HW, Simo Naala
#1099 VE3CFG, F. Gauchie
#1100 VE3EU, Stan Comach
#1101 W3SOH, Philippe A. Bates
#1102 W4IMI, K. A. Cole
#1103 CE3HL, Vicente Pascual Tost
#1104 K5KBH, Kenneth D. Grumm
#1105 HB9MQ, Felix Suter
#1106 ZS6IF, Lambert Ledoux
#1107 K9AVQ, C. A. Huffman
#1108 W5PQA, H. W. Meredith, M.D.
#1109 KH6DQ, John H. Oka
#1110 G3VA, J. Pat Hawker
#1111 W3UXX, John R. Shute
#1112 PAØVO, J. Van Oord
#1113 W9INN, Bill Fanckboner
#1114 W1OJR, Victor D. Politi

All-Phone WAZ

#36 DL7BA, Guenther Kuhne
#37 G3FXB, Al J. Slater
#38 W6YK, Bill Hunter
#39 W2HTI, Edwin Benkis
#40 W7PHO, W. H. Bennett

CW WPX

#63 WØQYE, T. P. Algren
#64 PY4OD, Talma D'angelo Drummond
#65 VK3KB, A. L. Kissick
#66 W9YSX, M. R. Franke
#67 JA2JW, Yohtaro Hoshiyama

Phone WPX

#7 W5ERY, Allen Watson

WPX Honor Roll

CW WPX

W2HMJ	516	PAØLY	310	VK3KB	302
W6KG	473	W3BQA	310	W3DBX	302
W5KC	405	W9BPW	310	W5LGG	302
OK1MB	397	DJ3BB	308	JA2JW	301
W9DYG	367	SM5BCE	308	LU5AQ	301
VE3DIF	357	W5AFX	308	PY4OD	301
W6WO	356	W1EQ	307	W2DGW	301
W8LY	354	DL1QT	306	W4HYW	301
W5DA	351	K5LIA	306	WØPGI	301
W1NLM	350	OK3DG	306	WØQYE	301
W2MUM	350	UA9DN	306	K2PFC	300
W8JIN	349	W9UXO	306	K4JVE	300
W9IU	344	K4HXF	305	K4KOY	300
DL7CS	330	K6SXA	305	KL7MF	300
W6YY	330	W5OLG	305	W2FXA	300
W4OPM	323	VE3BWY	305	W3BCY	300
K9EAB	319	W1BFT	304	W3LMA	300
G3EYN	318	W6RLP	304	W4GXB	300
W9YSX	317	OK1AEH	304	W8KPL	300
VK6WT	316	SM5CCE	304	EA4CR	299
PAØVO	315	W1FZ	304	F9MS	299
SM5AHK	311	W2EQS	303	WØGUV	299
W2PTD	311	W5AWT	303	W3UXX	280
W8RQ	311	W9VIN	303	OK1BY	207

Phone WPX

W8WT	441	CT1PK	350	ZP5CF	306
G3DO	385	W5ERY	311	W9UZC	302
PY2CK	354				

SSB WPX

K9EAB	180	TI2HP	155	W8YBZ	152
VE3MR	164	WØCVU	155	WØFUH	151
K2MGE	158	W2TP	153		

This month's behind the scene story comes from Doug, ZK1BG.

DX Rarotonga Style

Crash! A screaming, yelling mob of kids rushed past the hotel pushing what sounded like a petrol drum before them. I said to one of the guests, "What are they playing with?" "Looks like an oblong frame with a green painted panel on it," he replied.

That sounded only too familiar and I jumped up and started down the road. Sure enough there was my beloved rack and panel I had acquired from Ron, ZL2RC, some time before, being towed down the road in a cloud of dust.

I retrieved it and put it back with the Berry family's 50 odd crates and cases in the shipping sheds where they had been landed the day before. My ham activities had started in ZK1.

We had to stay in the hotel for a few days as our house was not quite ready, but within three days I had strung up an 80 meter zepp between an ironwood tree and a 50 foot coconut tree and put my HF 100 on to 3545 Kc/s. Now, back in New Zealand if I called CQ, I could hope to get another ZL back fairly quickly and sometimes a VK or even a W, but here it was different. I put out a short CW CQ de ZK1BG.-.-. -.- . Four hours later I staggered down the road back to the hotel after working a dozen Ws, a KH6 and a KL7, not to mention old Claude ZL1CI, who I always think sleeps with the cans on. Some three years and 5000 odd Ws later, I had worked 38 countries on 80. I then went up on 20 because I realized that I would never acheive DXCC on 80.

Rarotonga is ideal for the setting up of a hamstation, especially for DX work. There is a 250 volt AC mains supply. The weather never gets really cold as the annual average temperature is *75° F.* It is classed by many as the island with even more beauty, charm and romance than Tahiti. Humidity can be troublesome, though. I lost my modulation transformer and two power trannies through humidity. I found a complete layer of windings just a sloppy mass of green slush.

20 meters is the CW band for Rarotonga. All you need to do is to send out a few . . . - s followed by call sign and you sit back and pick the loudest and easiest signal. As soon as contact is made you can hear from s3 to s9 VFOs all doing a rapid QSY. Trouble is that half of them start calling too!

Some have delightfully unsteady VFOs, too. A South American with a six element beam and at least 6 KW beat out the W QRM once and called me, so I worked him. To get my RST and his name and QTH I had to follow him from 14031 down to 13950 *kcs.* I had to do this every over.

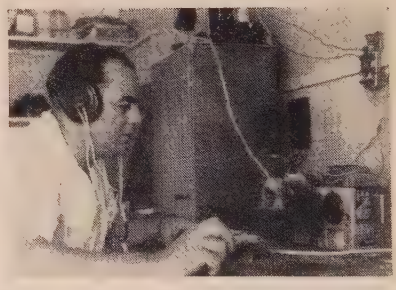
I suppose all hams have a queer streak. I know I have as after an hour or so on the key I get sleepy. Old Claude never would tell me what I said during a complete over I sent him while fast asleep. ZK1AA tells the story about an opr on his rig, who sent for quite a time during a contest a string of meaningless numbers and letters until Stuart, hearing this rushed out to find the lad fast asleep. Maybe the dream experts can get to work on this one!

Unfortunately, New Zealand law, which applies in this case, forbids third-party communications as several W hams have visited us and all were itching to put out a call. Only British subjects, duly qualified, can obtain a license.

Rarotonga is a mountainous island of 25 square miles and 20 miles by dirt road right round. The population is 7300 of which about 300 are Europeans. The ham population at the

Paula EA2CQ on location in Andorra, Paula and her OM Juan EA2CA spent 3 days as PX1DE (TNX W2KUW).

Juan, EA2CQ, during his trip to Ifni as EA9DE. (TNX W2KUW)



Doug ZK1BG at the key, rig in middle is 100 watt transmitter. Lower right 20 meter converter and command receivers

The U. S. Ambassador to Israel accepts a cup for W3IMV who was high scorer in North America in the jubilee marathon, 4X4BX, president of the I.A.R.C. is in the center and 4X4DR on the right.

moment is 4, Bill Scarborough, ZK1BS, ex ZK2AA, Stuart Kingan, ZK1AA, Eric Dinnan, ZK1AU and myself. ZK1AK, Norm Walding, is the lone ham on Aitutaki Island, 150 miles north of Rarotonga. Bill is probably the most active on 15 and 20 phone SSB and CW. Eric and I are on 20 occasionally and although Stuart has an all band rig, he is devoting most of his spare time to teaching ham radio. He has started a radio club which will shortly be coming on the air on 80, 40 and 10 meters. Call sign ZK1B-(Last letter doubtful but following 1 BN).

The rig here is all home brew. Crystal controlled osc—buffer—two pp 807s which took me three months to set down properly running 100 watts to a long 260 foot wire. The receiver is also Xtal controlled using a 3600 Kc/s Xtal multiplying to 18*mcs* and fed into a command receiver tuning from 4mc/s back to 3.7 *mcs,* which nicely tunes the IF.

I finish up here in October, so will probably be firing up ZL2AJT again next year. However, I hope to get on nightly for a month before I return and clean up my local QSLs. I've lost two log books since coming here so I'm afraid I owe a few QSLs.

Maybe we'll meet again on 20 before October?

EAØ **SPANISH GUINEA—EAØAF** has been very active operating on 14057 around 1600 to 1700 *GMT* weekends and also 0500 to 0700 *GMT* weekdays.

KR6 OKINAWA—Okinawan Nationals may soon be granted licenses. If all turns out well, license examinations will be given in September and October and operation will begin in November. They will more than likely use a KR8 prefix. (Tnx KR6CK).

EL LIBERIA—Ken, EL4A, in three months of operation, has 105/40 record. He will be in Liberia for two years and has set a goal of 25,000 QSO! A trip to Togoland may be pending if permission can be obtained. Ken is anxiously awaiting his BC61O and will hit all bands, including 160.

OHØ ALAND ISLAND—This letter from Sam, OHØNC sums up several received recently from DX stations regarding SWL's.

"Being the only fairly active amateur station on the Aland Islands, I have been put under a heavy pressure for QSL cards, and therefore to lessen the burden, (both economical as for time), I have had to make the decision to cease sending cards to SWL's, except in cases where the card is of real value, such as for activity on 6 and 2 meters and for contacts with rare stations that are notoriously bad QSL'ers.

I know pretty well that my signals are getting out, as I regularly have contacts with all parts of the globe, and therefore, the ordinary SWL cards are of no value to me.

Of course I will as before send cards to all stations I have contacted, upon receipt of their cards.

Hoping that the activity will soon get better over here, so that SWL's will also be able to get cards from this rare country, I wish you best 73 and good DX-hunting."

On the other hand, EL4A, being an ex SWL, will answer SWL's.

OK CZECHOSLOVAKIA — From Jan, OK1JX, comes the following information.

1. **OK1HI,** Josef Hyska, died by a heart collapse on July 1, 1959. He was 44 and a well known DX man. Many will remember him as a successful QSL Manager for CAV for several years. When on tour of duty in Hanoi, Viet-Nam, he worked under a call of 3W8AA.

2. **JT1AA**, Ludvik Kloucek, and JT1YL, his xyl Milada, got their home licenses recently. They are OK1KW and OK1KX, respectively. Ludvik is hastily building an all-band transmitter, so they will appear quite soon on the DX bands. All of their JT qsl's are out now, but it appears that very many went astray in mailing, so duplicates are managed wherever necessary.

3. **Bohous, JT1AB,** tried to handle his qsl's himself directly from Mongolia, but experienced quite a many incoming and outgoing cards lost. So a new arrangement has been made that his cards will be managed by Milada, OK1KX, ex JT1YL. Cards should go to P. O. B. 69, Praha 3, via the Central Radio Club of Czechoslovakia. Any previous info that they are being handled by OK1JX are false.

4. **7GIA** appearing recently on 14 and 21 mcs from Konakri, the capital of the Republic of Guinea is a Czech amateur, name Josef. His cards should go to OK1PD, via Central Radio Club of Czechoslovakia, P. O. B. 69, Praha 3. He's quite active on CW and SSB and will give a new country to many, continuing the tradition of FF8AC/GN. Josef is an experienced DXer, and will be active for several months from over there.

5. We participate with the hams all over the world who are disappointed with the operations of **OK7HZ/ZA** from Albania. In fact, the managing committee of the Central Radio Club of Czechoslovakia disapproved and criticized the extensive propaganda concerning this expedition right from the beginning, as it was clear to us that the expedition was to be a scientific and journalistic one, the amateur radio being only a means of contact with their home and a fill-in for the sporadic leisure time. Our criticism was that by such propaganda, unrealistic promises are made which, when not fulfilled, would mean a great disappointment with not only the expedition members, but the Czechoslovakian hams as well. In vain, we tried to persuade the expedition's operators to work CW extensively at least from Albania; but they chose to work only SSB as the easiest mode. There's more confusion in the whole matter; briefly, as they cannot be persuaded in some aspects of a real amateur work; we, as a body, refrain from their activities. Nevertheless, their qsls should go to CRC, P. O. B. 69, Praha 3.

In fact, both OK7HZ and OK7ZH made it clear right from the start that the goal of the expedition is a scientific one, and that the amateur radio will be the smallest of their activities.

6. OK stations active on single-sideband:

OK1IH, Lada (remember his good going in the 1957 ARRL CW Contest), with a KWM1, and building a filter type exciter of his own;
OK1FT, Jirka, and OK1GV, Pavel, with two identical home-made filter-type exciters;
OK3LA, Josef, with a phasing-type 14 mcs rig;
OK6CAV, a Club station of the Czechoslovak Academy of Sciences, with either OK1FT's or OK1IH's exciters with a 1KW final. This station has been formed especially as a home correspondent for OK7HZ and OK7ZH expedition.

Preparing themselves for SSB work, in various stages of construction:

OK1FF, Mirek, a filter-type exciter almost ready;
OK1ASF, Franta, ditto;
OK1VE, Karel, building a third-type exciter;
OK1JX, already finishing an LC-type 15, 5 kcs receiving adapter and starting the construction of a xtal filter-type exciter (mainly after W6TEU).

YA AFGHANISTAN—Both YA1PB and YA1IW have been active on the high end of twenty meters (above 14300) on both AM phone and CW. The best time for the states is about 2300 to 2400 GMT. QSL for YA1PB via KH6OR.

WØ SOUTH DAKOTA—On October 30, 31 and November 1, KØKWB, WØNKG, WØNNW, WØUVV, KØBSV, WØLFM, KØMKP, KØJBS, and KØJQX will journey to South Dakota to give as many DX stations as possible a QSO with this hard-to-work state. A 500 watt rig and tri-band beam will be used on 28600 to 28750, 21270 to 21300 and 14230 to 14250 around the clock. They will tune for AM and SSB. The call WØEQU will be used and QSLs should go to the Ak-Sar-Ben Radio Club, Box 626, Omaha, Nebraska or via the WØ QSL bureau. (Tnx WØNKG)

ZC3 CHRISTMAS ISLAND—Received a letter from Jack, G3MEY, who is now on Christmas Island awaiting a license. For a start, he will be on 40 and 80, due to the difficulty in obtaining gear but will be on 10, 15, and 20 in the next few months. They are also forming a club station which will also be on shortly. Jack, as you might remember, is ex ZC4JL.

ZC6 PALESTINE — Without getting involved in the political issues, we were intrigued to learn that the ARRL will now accept cards from any station in the City of Jerusalem for Palestine credit. Look for 4X4DK on SSB and 4X4DI on CW. VE3EJD, who normally operates portable SU, recently spent two hours as VE3EJD/ZC6. Bob told me, during a QSO, that he is in Palentine every day and that he will operate there again in the near future for a longer period.

ZM6 BRITISH SOMOA—Hip ex ZM6AS is now ZL2ANB and requests anyone not receiving a deserved ZM6AS card to write him, sending no IRC's. His new QTH is ZL2ANB, 27 Blake Street, Waitara, New Zealand. (Tnx W2HMJ)

DXpeditions

Things have been developing so fast recently that there hasn't been enough time to get the news out. Such an expedition was EA2CA's trip to Ifni as EA9DE on SSB. A KWM-1, furnished by W2KUW, was used and over 1300 QSO's were made in four days. The trip was scheduled to last longer but the main power transformer failed, forcing him to return home. He had no sooner returned home, fixed the rig and put his wife, EA2CQ, in the car, when he was off to Andorra for a few days operating as PX1DE. Juan is going to EA8 and EA6 and possibly EA9 Rio de Oro in September. QSL to W2KUW for both EA9DE and PX1DE.

The all Mexican XE4 expedition, after many setbacks, completed a very successful stay as XE4B. They operated all bands on CW, AM and SSB. QSL to the XE bureau.

Certificates

A very attractive triangular shaped certificate is issued by the Radio Club of Puebla, Mexico. The rules are as follows:

1. AMATEURS IS MEXICO: Contact with four amateur stations in the City of Puebla on 2 different bands.

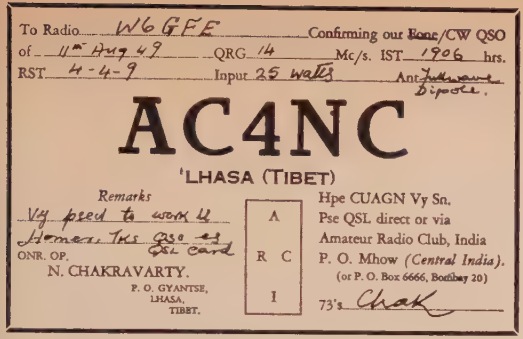
2. AMATEURS IN THE AMERICAN CONTINENT—Excepting Mexico—Contacts with 2 amateur stations in the City of Puebla on two different bands.

3. AMATEURS IN EUROPE, AFRICA ASIA and OCEANIA: Contacts with two amateur stations in the City of Puebla on any band.

Only the contacts made after the 1st of Jan 1959 are valid, they may be on CW, Phone or any combination.

All QSLs or written proof of two way contacts with amateurs in Puebla, Pue. Mexico must be submitted by the applicant together with $1.00 to cover return of QSL's and certified air mail postage of the Diploma to the following address:

L.M.R.E.A.C. Club de Puebla
2 Poniente 511
Puebla, Pue. Mexico


To Radio W6GFE Confirming our Fone/CW QSO
of 11th Aug 49 QRG 14 Mc/s. 1ST 1906 hrs.
RST 4-4-9 Input 25 watts Ant Inverted Vee Dipole.

AC4NC

'LHASA (TIBET)

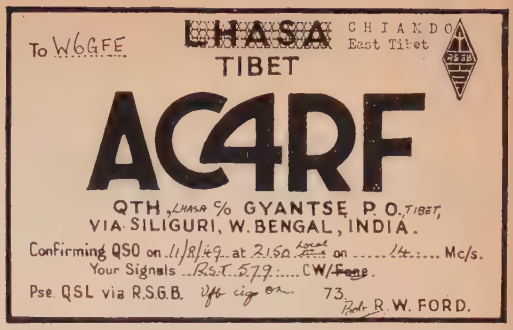
Remarks
Vy pred to work U
Homers Tks QSO as QSL card

ONR. OP.
N. CHAKRAVARTY.
P. O. GYANTSE,
LHASA,
TIBET.

A
R C
I

Hpe CUAGN Vy Sn.
Pse QSL direct or via
Amateur Radio Club, India
P. O. Mhow (Central India).
(or P. O. Box 6666, Bombay 20)

73's Chak


To W6GFE LHASA TIBET CHIANDO East Tibet

AC4RF

QTH, LHASA % GYANTSE P.O. TIBET,
VIA SILIGURI, W. BENGAL, INDIA.

Confirming QSO on 11/8/49 at 2150 GMT on 14 Mc/s.
Your Signals RST 579 CW/Fone.

Pse QSL via R.S.G.B. Vy sig QRN 73, Bob R. W. FORD.

This is DX's million to one shot—three AC4's in one operating session. Here is W6GFE's own story of this incredible feat of 10 years ago.

"In July, 1949, it was rumored that ZD6DH would be on August 11th on an expedition to Nyasaland. At this time, I had only a fixed 8 JK antenna and a long wire to work DX, so I thought it was high time I put up a rotary. The thought of working ZD6 (at that time a real rare one) gave me the necessary incentive.

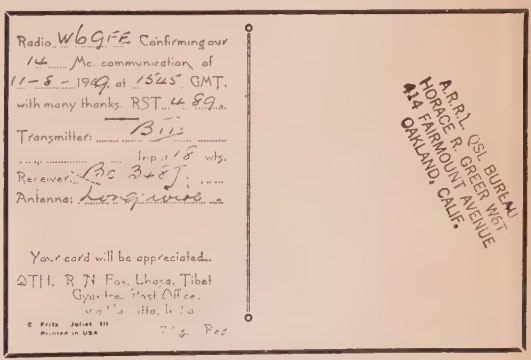
I finished the beam on August 10th and hastily mounted it on a 25 foot pole, manually rotated.

I got on the air about 5 A.M. on August 11th to check the beam out. About 5:30 A.M. the band opened up. Among other DX, I singled out AC4NC. After a couple of calls he came back to me for my first AC4 QSO (country No. 178).

After a few telephone calls to alert the local gang, I got back to see what else I could dig out. Nothing of any consequence happened till about 7 A.M. At that time the band opened up better than I have heard it before or since. Among other DX sigs, up popped AC4RF with an S7 signal. This was Bob Ford, who was later to become internationally famous because of his unjust imprisonment due largely to his amateur radio activity. Bob was quickly worked and we again combed the band for something else rare.

A short time later, we heard a W6 calling AC4YN. Sure enough there he was with a fat S7 signal. With my hand shaking a bit from excitement, I called him and back he came. This tied a ribbon on my biggest thrill in ham radio.

Incidentally, on August 12th, I worked ZD6DH, whom I really had to thank for getting my 3 elements up for the big opening."


Radio W6GFE Confirming our
14 Mc. communication of
11-8-1949 at 1545 GMT.
with many thanks. RST 4 89
Transmitter: Bliss
Input 15 wts.
Receiver: RC 348 J
Antenna: Long wire

Your card will be appreciated.
QTH: R. N. Fox, Lhasa, Tibet
Gyantse Post Office.

A.R.R.L. (QSL BUREAU)
HORACE R. GREER, W6TT
#14 FAIRMOUNT AVENUE
OAKLAND, CALIF.

QTH's

With over 5500 QSO's on his recent Caribbean trip, VE3MR had quite a bag of QSL waiting on his return to Toronto, but Martin assures us that all will have been answered by the time you read this.

Thanks to CN8GV, EL4A, KL7AL, K2QXG, VE3MR, W2HMJ, W5GHK and W6KG for the following:

CE3NE—Box 2101, Santiago, Chile;
CN8GV—APO 118, c/o PM, New York, New York;
CP3CN—P.O. Box 651, Oruro, Bolivia;
CR9AM—P.O. Box 111, Macau, Asia;
EL4A—Ken Bale, c/o Lelourneau Inc of Liberia, Roberts Field, Liberia, W. African;
FY7YF—(SSB only) via VE3MR;
HIØKC—via W6AWT;
KL7AL—Box 488, Nome, Alaska;
LX3PF—via DL9PF;
PJ5AC—via VE3MR;
PZ1MR—via VE3MR;
TI9CB, TI9SB—via TI2HP;
VE8TH—c/o 926 Squadron, Frobisher Bay, Baffin Island;
VP3RO—via VE3MR;

[*Continued on page 103*]

ham clinic

by CHARLES J. SCHAUERS, F7FE/W6QLV
CQ Magazine, 300 West 43rd St., New York 36, N. Y.

Tubes and Testers

Today it is a relatively simple matter to pull out the tubes from one's equipment and carry them to a TV-radio shop or parts house to have them tested. This is, I think, the biggest reason that most hams do not own their own tube testers. Another reason of course is cost. But again, companies like EICO, *Heath, Allied Radio* and others offer tube testers in kit form for mighty little money.

Surplus tube testers similar to those offered by *Barry Electronics Corp.,* (if of the dynamic mutual conductance type—I-177A etc.) are inexpensive and well worth the money.

The ham who has sunk over $500.00 or more in station equipment should consider owning a good reliable tube tester; it is a good investment!

Tube testing is a manufacturer's "headache," because it is necessary to *compromise* (to a limited degree) on characteristics. That is, picking one "evaluational characteristic," building a tube tester for specifically measuring it; then measuring thousands of assembly line produced tubes and coming up with comparative test data to be used by the guy who buys a *particular* tester is a big job.

What tube characteristic best describes a tube's condition? Well, there are a number of characteristics which are important, but a tester to check them *all* would be quite a large gadget! So what happens?

One or two characteristics are usually chosen by tube tester manufacturers to measure a tube's worth against a *known standard.* It is speculated that if these two characteristics are okeh, the tube (outside of internal shorts) should perform within the limits set by the designers. But sometimes this is not true.

I have taken two new tubes (from the same manufacturer); both checked out the same. In a specific application (HF oscillator) however, only one really performed with top efficiency. I have no answer for this—nor does anyone else.

The simplest check of any tube is done through the emission test. This test envolves the tube's electron emitting structures (filament and cathode). If a tube checks low on emission, you can bet that tube will not perform efficiently as a whole. On the other hand, "hot spots" may develop on a cathode of an old tube and the tester (emission) meter needle will read "good," yet the tube is bad. (Internal emission "distribution" is faulty.)

All tubes when checked on an emission checker are considered (and switch-connected) as diodes. An ordinary milliameter gives a "reference" plate current reading. If emission is low, plate current will be low.

The best (practical) test is the dynamic transconductance (mutual conductance or *gm*) method because a tube is tested under conditions approaching actual operating conditions.

Transconductance is a better practical measure of a tube's worth than emission alone because it is a factor which combines its amplification factor (*mu*) and the plate resistance (r_p), and is the quotient of the first divided by the second. The micro-mho (umho) is the unit of gm measurement—for the familiar 5881 in pentode connection for example, it is 6100. The umho is a millionth part of a mho (conductance—ohm spelled backwards).

Tubes which test too high should not be trusted any more than those which test too low. All *gm* testers show readings in mhos and a deviation of a 1000 or so is nothing to worry about. (Remember the hotspot cathode if readings are too high.)

Most emission checkers show English scale readings, e.g., "bad," "doubtful" and "good." More tubes are sold if an emission checker is used—it is truly and outstanding "salesman." Make sure your ham tubes are tested on a gm checker.

There are few tube testers around for transmitting tubes; that is, available to the ham. But if the average amateur carefully watches his meters while operating they can indicate tube trouble about as quickly as any other method. Lower plate current in the final (at usual load and drive settings) will indicate lowered tube performance. Excessive current will (in most cases) indicate a gassy bottle (with usual load and drive settings).

Checking for shorted tube elements is usually done on most testers by using a series neon bulb. Remember that there are two kinds of shorts, e.g., hot and cold. Be sure and allow a tube time enough to warm up sufficiently so that its elements will have time to expand (in multi-element tubes with very closely spaced elements, this is important).

Some checkers incorporate a circuit allowing one to check for thermal and mechanical noise. Microphonic tubes are easily detected as well as those which may have high resistance filament to cathode shorts.

But after all is said and done, the measure of

a tube's worth is best judged by its *actual* operation in a *specific* application. This envolves picking a tube (out of 3 or 4) which performs the best.

Observation

DX to me is more than just a contact for a QSL card. Having traveled all over the world and now being forced (because of my work) to live temporarily in Europe, I have learned to look (carefully) at both sides of the amateur operating "picture."

To me, **DX** is not only a test of my equipment and my operating ability but it is also a test of how well I can help my country (USA) in the furtherance of International good-will!

But after listening to many American stations I am inclined to think that some hams have forgotten one big thing in the pursuit of their hobby.

How you conduct yourself on the ham bands (that are monitored throughout the world) is an indirect reflection on many facets of the American way of life. Some of the remarks made by some hams (seeking DX at all costs) are not only insulting (in some instances) but make it tough for others who do have consideration not only for their hobby but the customs of the foreign hams to whom they are talking.

There are many things we Americans can brag about, but it is better that we forget them when we are talking to hams less fortunate! Real culture is not measured in material terms. Be helpful to your brother hams, regardless of who they may be, and exude the free American ham spirit—above all, remember you are American and representing America! (Incidentally, again I appeal to you to send your spare copies of CQ, QST, WRA and other technical publications to foreign hams by arbitrarily picking out call and QTH from the call-book.)

Let us hope CQ makes the USIS list. Today, (for not being on the list) in Yugoslavia, a subscription costs over a third of a month's pay!

Questions

32V

"Any published changes around relative to modifications to my *Collins* 32V which will improve performance without using a meat ax?"

Yes. Get a copy of CQ Anthology (from CQ for $2.00). Beginning on page 117 is an article by the "writingest" ham on the globe, Bill Orr, covering changes on the 32V.

Calibration Accuracy

"What would you say optimum calibration accuracy for a receiver should be in terms that or any other average ham like me can understand?"

I'd say 1000 cycles (1 *kc*), but with mechanical filters (for receiver selectivity etc.) 3 kc is good enough . . . and this is stretching it a little.

DSB Mod Transformer

"Please recommend a good modulation transformer for 6146s used in a DSB final."

Sure. I like the transformer made by Thordarson (#70D29) and used in the circuit on page 109 of Stoner's SSB Handbook (the latter available from the Radio Bookshop—see ad in this issue).

Matching Diodes

"Any easy way to match diodes (IN34A etc.) without lab equipment?"

Gosh yes. Use an ohmmeter and measure forward resistance of each diode. Pick the two, three or four with the closest similar reading.

Tube Reactivation

"Can I reactivate radio tubes by applying 50% more voltage to their filaments?"

You could with the old thoriated types and definitely not with the indirectly heated ones.

Walkie-Speakie

"Where can I get info on a Walkie-talkie for 10 meters?"

November '51 and July '53 CQ contain the info.

DSB Transformer (again)

"For 6146s in a final for DSB I understand one can use an old power transformer and get a fairly good match. What's the rating have to be (sic)?"

110 volt primary 600 volt secondary (ct).

TX-1

"I have a Heath TX1 transmitter which has operated splendidly since I put it together, but of late I noticed that my neutralization seems to change. I also note a 60 cycle hum (and can see it on my scope). Any hints?"

Yes. I'll bet the same thing is happening which happened in mine. First, neutralization is accomplished in the Apache with a single wire coming up to the 6146s, any movement of this when the transmitter is operating will of course change neutralization a little. The fan is the culprit! Make SURE it is not mounted too tightly and that the blades are not bent and are even. Also, if you have a microphonic 6AU6 VFO tube it will pick up the vibration from the fan . . . simple as that. Bet that's a part of the hum you write about. Replace the tube, tune in the carrier (*bfo* on receiver off), turn up the *rf* receiver gain and hit the tube and listen. It may take two or three tries before you find a tube that is NOT microphonic. If your hum is not cured with the above, jerk out the high voltage rectifier tubes and examine the tube sockets and look for flashover between used and unused pins

[*Continued on page 104*]

sideband sideband sideband

SIDEBAND

By: Bob Adams, W3SW
P. O. Box 625
Silver Spring Md.

Worked 100 Countries

Two-Way SSB
(In order of award)

W6UOU	W8PQQ	PY2JU	W3MAC	W4CDY
W2JXH	ZL3PJ	W6UPP	W1GR	W6TOT
F7AF	K2MGE	W6PXH	W8JXM	W9HP
K6GMA	W2OQO	WØCVU	W1EQ	W5DA
W3SW	W2VZV	W4INL	W5FDZ	K7GIE
W4IYC	W6IAL	W8YIN	W8JXY	W1LHZ
TI2HP	K2JFV	TG9AD	W2OTZ	W2MA
W8QNF	W1ADM	W3NKM	W5BGP	W6BAY
W6ITH	TI2RC	W6QFE	W6WNE	W5RHW
VE3MR	W2CFT	W8MG	W6TNS	W5PSB
W8GCN	KØABH	PY4TK	W4HIM	K4HXF
W8EAP	ZL3IA	K9EAB	HB9TL	K2EWB
W8YBZ	W6BAF	W7IAA	K2HEA	K2HUK
WØQVZ	W2TP	VQ4ERR	W7VEU	VE3SE
WØFUH	W6RKP	W8MPW		

IT IS MY PLEASURE TO WELCOME THREE MORE SIDEBANDERS TO THE "WORKED 100" CLUB, namely; W5DA, K7GIE and W1LHZ. There are now 73 members who have qualified for this award. As is indicated, all U.S. districts are represented in the listings, with the sixth district leading with ten stations. We have been advised that QSL cards and applications are enroute from several additional DX stations, including HB9IE, ZS6KD, VK3AEE and 4X4DK.

Now that the long awaited QSLs are on the way from PYØNA for his dx/pedition on Trindade Island last October and November, and those from Win, ZL3DX's activity as ZM6AC, VR5AC and ZK2AC etc. all mailed to those who sent self addressed envelopes, we should be receiving many applications.

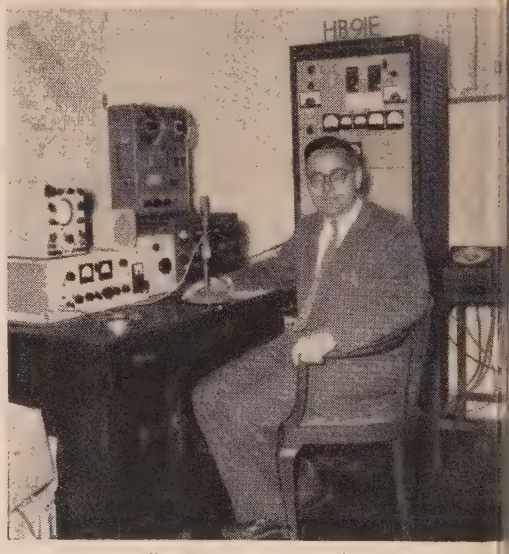
Flavio, PY1CK sends the following information about his PYØNA activity on Trindade which is a Brazilian Navy IGY base: He experienced difficulty in obtaining special picture type QSLs from the States and finally had them printed in Brazil. On sideband 304 contacts were made with stations in 27 countries.

The first stations to be worked in each country were PY2CK, EA2CA, TI2RC, W8PQQ, VE2WW, OA4IY, YV5ABD, GM8CE, DJ3CF, HB9IE, G13CWI, KP4WN, 3A2AY, OHØNC, G3MY, GW3LLU, ZS5JM, F9HF, 4X4DK, VQ4ERR, VK9AD, ZL3PJ, JA1ACB, VK5AE, PJ2AA, ON4DM and TG9HB.

The following were the first stations worked in each of the U. S. districts: W1DCE, K2CJN, W3MAC, K4HXF, W5TIZ, W6ZEN, W7PHC, W8PQQ, W9YHE/9 and KØKWY.

The transmitter was a 10-A driving a modified Viking 11. Antennas were long-wire. The receiver was a Hallicrafters SX-71. QSL should be sent to PY1CK, Box 5292, Rio de Janeiro, Brazil.

Bill, ZK1BS arrived in Vancouver in July and expects to travel extensively through the State meeting many of his numerous friends. Bill



Bill, ZK1BS of Cook Island.

hopes to show colored slides of New Zealand and of the Island to any Ham Clubs who would be interested in seeing them. Bill's picture appears in this column.

After three months of careful checking and cross checking we have finally determined the official totals of those stations which submitted logs for the Third Annual CQ SSB World-Wide Sideband Contest which was held on April 18th. Nearly six hundred logs were received

WA2BLH, Mike.

although stations including SVØWB who are known to have participated and made high scores did not send in a log.

"The King is dead; long live the King." We now have a new champion. He is Peter, HB9IE, and we are happy to be able to show the photos of him and his station and antenna. After two years in which Eva, CN8MM was the winner, the championship moves to Europe. The W3SW cup suitably engraved will be presented to HB9IE by our Editor, Wayne, W2NSD while he is in Switzerland in September. Peter's official score was 57,528 points with 612 contacts in 94 prefixes. This is a wonderful accomplishment in twenty-four hours, and compared with the other AM and CW Contests with their various multiplier point systems really indicates the advantages of SSB with its fast voice break operation.

Peter, HB9IE winner of the DX SSB Contest.

HB9IE's WD3ZZ Antenna and home.

Not too far behind HB9IE and already preparing for next year's Contest we find Ami, X4DK with 461 prefixes for a total of 48,866 points to take second place honors. We hope to show a picture of Ami and his station in next month's column.

Bill of W2SKE, who participates in all Contests with top honors, showed that he could also do it with SSB. He was the high W/K scorer with 46,384 points. Bill worked 446 stations in 104 prefixes, to take third place. A new comer to SSB, Dale of W6VSS, took fourth honors with his 41,454 points. Cyril, VK3AEE who rarely enters Contests went all out for this one and although he did not operate the entire twenty-four hours he placed fifth with 40,994 points.

This was the first Contest for Chuck of K6LAS and he placed sixth with 36,436. Wonder what he will do next year with the experience gained in this one?

TI9SB was the dxpedition station of TI2HP and VE3MR and with a poor antenna and plenty of trouble with power failures etc., they ran up a very creditable total of 34,400 points. 430 stations were worked by TI9SB during the Contest.

Wm. ZL3DX was practicing for his scheduled dxpedition to the islands and scored 30,450 points. His log was typed on one side of a sheet of paper six feet long. One of the prettiest logs was received from Don, KL7CDF, who carefully typed all details including the time of each contact and the conutry in which each contact was located.

The following is a list of the stations who totaled above 2500 points. Certificates will be mailed to each of the top twenty five.

Station	Contacts	Prefixes	Total Points.
HB9IE	612	94	57,528
4X4DK	461	106	48,866
W2SKE/2	446	104	46,384
W6VSS/6	440	94	41,454
VK3AEE	389	103	40,994
K6LAS	439	83	36,436
DL1VR	423	85	35,955
TI9SB	430	80	34,400
HB9TL	376	90	32,840
ZL3DX	350	87	30,450
W1HKK	300	98	29,400
SM6BSK	303	93	28,179
KZ5WZ	407	64	26,048
VQ4ERR	303	84	25,452
K2USA	239	89	25,377
W9EWC	242	102	24,684
K5LZO	316	77	24,332
W3SW	278	87	24,186
DJ1BZ	261	82	21,402
KL7CDF	266	79	21,014

[*Continued on page 105*]

CONTEST CALENDAR

by Frank Anzalone, W1WY
14 Sherwood Road, Stamford, Conn.

September	5-6	LABRE CW
September	12-13	LABRE Phone
September	12-13	Peruano Phone
September	19-20	Peruano CW
September	19-20	SAC CW
September	26-27	SAC Phone
September	26-27	MARC VE/W
October	3-4	VK/ZL Phone
October	10-11	VK/ZL CW
October	24-26	CQ WW DX Phone
November	7-8	ARRL SS
November	14-15	ARRL SS
November	28-30	CQ WW DX CW

LABRE

CW

Starts: 00:00 GMT Saturday, Sept. 5th.
Ends: 24:00 GMT Sunday, Sept. 6th.

Phone

Starts: 00:00 GMT Saturday, Sept. 12th.
Ends: 24:00 GMT Sunday, Sept. 13th.

Rules and scoring information in last month's Calendar.

Mail your logs to: The LABRE Contest Commission, Caixa Postal 2353, Rio de Janeiro, Brazil.

PERUANO

Phone

Starts: 12:00 EST Saturday, Sept. 12th.
Ends: 24:00 EST Sunday, Sept. 13th.

CW

Starts: 12:00 EST Saturday, Sept. 19th.
Ends: 24:00 EST Sunday, Sept. 20th.

Remember, this contest is limited to stations in the American continents only. Refer to last month's Calendar for details.

Mail your logs within 20 days of ending dates to: Radio Club Peruano, Att: Commission Concursos, Casilla 538, Lima, Peru.

S A C

CW

Starts: 1500 GMT Saturday, Sept. 19th.
Ends: 1800 GMT Sunday, Sept. 20th.

Phone

Starts: 1500 GMT Saturday, Sept. 26th.
Ends: 1800 GMT Sunday, Sept. 27th.

1958 VE/W Contest Results

VE3UOT operated by Thain McDowe VE2NI, was Top Man and winner of t Rupert Grant, VE2QQ Trophy.

Following are the certificate winners a leaders of their respective sections.

Canada		W4BEY	57,020	WØRLI	24,
VE3UOT	**132,468**	W3GYP	56,605	W6OUL	24,
VE2BN	109,440	K4HXF	50,684	W2OWE/5	22,
VE4SX	96,615	W6NZW	45,735	K5MBB	21,
VE1ADX	63,600	K2EIU	44,475	K5KEL	21,
VE7EH	57,228	K5IIN	44,349	WØVFE	19,
VE8TO	50,400	W4VPD	42,454	K7CHH	18,
VE5DZ	39,904	W3NCF	41,262	W1SAD	18,
VE6HQ	36,624	K5JPB	40,288	WØDW	17,
VO2NA	34,848	W6JKJ	39,955	W1SKT	17,
United States		W8FAW	39,475	K7AWW	17,
K6SXA	103,806	W1GYE	38,988	KL7CDF	13,
K9ALP	99,420	KØITF	37,363	WØPOQ	11,
W9NII	87,236	K4SSB	36,551	WA6CEZ	11,
W5LCG	75,053	W2EXB	34,873	K7CDX	11,
K2MWK	71,641	W8DIS	33,356	KH6IJ	7,
K6QHC	64,980	W4SHX	32,490	K7AST	7,
K4LTA	64,335	W7LEV	32,165	W3ZBD/1	7,
K6OPI	63,031	W4KVX	30,866	KØCNC	6,
W8AJW	61,893	W2BWW	28,160	K7BWV	5,
W3AYS	61,731	W1FZ	26,967	KØKLB	5,
KØDQI	60,919	W1KGJ	26,786	K4MUP	1,
W9YSX	59,457	K2GTC	24,939		

A new one organized by the Scandinavi block, this year sponsored by the SARL Finland. A complete outline was given in t July Calendar.

Your logs should be sent to the SAR P.O. Box 306, Helinski, Finland.

MARC VE/W

Starts: 18:00 EST Saturday, Sept. 26
Ends: 24:00 EST Sunday, Sept. 27th.

This is strictly a Canadian/US party, e tending over a 30 hour period. However y are limited to 20 hours of operation on Therefore it is necessary to show times and off on your log.

Message—Example: W1WY de VE2BB Nr RST 579 Que. Your number of course pr resses with each contact.

Points—Each completed contact counts points. The same station can be worked on on each band, Phone and CW.

Multiplier—For U.S. stations. (a) Number VE sections worked, multiplied by 7.22. Power multiplier of 2 if input of less than watts is used; 1.5 if input is 30 to 100 wa and 1. for over 100 watts. (c) Addition multiplier of 2.5 for all W/K stations.

Scoring—Example for W/K stations: Contact points X VE sections worked X 7.22 X power multiplier X 2.5 for final score. The 7.22 multiplier is the ratio of VE districts (9) to the ARRL sections (65) and the 2.5 multiplier is the ratio of logs received in past contests. This is used to equalize the scoring between U.S. and Canadian stations.

Note—There are 9 VE districts, VE1 thru VE8 plus VO. Therefore your maximum multiplier is 9. (Not 9 for each band.) The same station can be worked once on each band on CW and again on each band on Phone.

You are expected to score your own log and check for duplicate contacts. Include a summary sheet giving all the essential information: Call, ARRL section, address, number of operating hours, power used and the scoring. Sign the usual declaration that all rules have been observed.

Do not write for log forms as none are distributed. Make up your own according to information given above. Run contacts concurrently, noting band and mode of operation, along with the time, message received, message sent, new sections as they are worked, points and etc.

Send your lot not later than October 12th to: Gordon H. Webster, VE2BB, 69 Pine Beach Blvd., Dorval, Quebec, Canada.

VK/ZL

Phone

Starts: 10:00 GMT Saturday, Oct. 3rd.
Ends: 10:00 GMT Sunday, Oct. 4th.

CW

Starts: 10:00 GMT Saturday, Oct. 10th.
Ends: 10:00 GMT Sunday, Oct. 11th.

This contest is alternately sponsored by the WIA and WIA. Since the WIA do the honors this year, the rules take a different pattern. The object of the contest is for outside stations to contact as many VK/ZL stations as possible.

Serial Nrs.—The usual five or six figures made up of the RS or RST report plus three figures which may begin with any number between 001 and 100 for the first contact and progressively increase with each station worked.

Scoring—Five points are scored for each contact on a specific band with a VK or ZL call area. In addition a bonus of 50 points will be credited for each new call area worked on a specific band. Note sample log.

Awards—Certificates will be awarded to the highest scorer in each country and each call area in VE, W/K and ZS. Additional awards will be made to the highest scorers on different bands provided sufficient returns are received.

There is also a receiving section for members of Short Wave Listening Clubs, and awards are made on the same basis as for transmitting stations.

Entries must be posted not later than the 31st of October and mailed to the W.I.A., Federal Contest Committee, Box 2611W, G.P.O., Melbourne C.1, Victoria, Australia.

[*Continued on page* 111]

VK-ZL DX Contest, 1959
Page 1

Name.....Section.....
Address.....Call Sign.....
Claimed Scores: Total .....
Band Scores: 80 Metres.....
40 " .....
20 " .....
15 " .....
11 " .....
10 " .....
Tx Input Power.....Aerial (s).....

Declaration: I hereby certify that I have operated in accordance with the rules and spirit of the Contest.

Signed.....
Date.....

VK-ZL DX Contest, 1959
Page 2

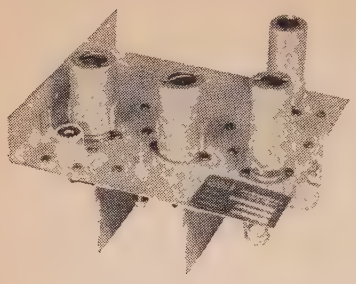
Date Oct.	Band Mc.	Time G.M.T.	Station Worked	Serial Sent	Serial Received	Points Claim.	Bonus Points	(Leave Blank)
3rd	14	1054	VK2XYZ	57001	54027	5	50	
	14	1100	VK3ABC	54002	44131	5	50	
	14	1110	VK3AXQ	46003	57008	5	—	
	21	1220	VK3AZX	58004	56045	5	50	
	21	1230	ZL2XYZ	56005	57152	5	50	
	21	1257	ZL2ABC	55006	45013	5	—	
	21	1315	VX9XY	57007	58141	5	50	
	21	1405	VK9AB	59008	59016	5	—	

TOTAL (Points Claimed + Bonus Points) 40 + 250 = 290

[Contestants are requested to maintain "sent" serial numbers in the correct sequence and **not to divide their logs into bands.**]

PUT YOUR SCR–522* TO WORK

. . . with AMECO's Model AM Converter



The new AMECO Model AM Converter Kits, for direct replacement of the SCR-522 front end—mounts inside the 522 receiver. Available for 2, 6, and 10 meters, crystal controlled or variable tuning. Has 12mc output for SCR-522 I.F.; other I.F. frequencies available. Here is a low cost way to get a top performance receiver with 1.0 microvolt sensitivity, 20 db gain and a noise figure below 6 db. Crystal controlled model available for Unicom, CAP and CD frequencies. Complete with all parts and tubes, specify frequency.

Model AM-1 Converter Kit, Crystal Controlled

$45.50

Model AM-2 Converter Kit, Variable Tuning

$37.50

(add $12.50 for factory wiring)

*Converters for other type receivers also available in the same price range. Inquiries should specify receiver make and model.

A DIVISION OF ANTENNAVISION INCORPORATED

ameco

2949 W. OSBORN ROAD • PHOENIX, ARIZONA

NOTE: Enclose 25% deposit for COD shipments. Shipping costs included in cash sales, added to COD sales.

For further information, check number 61 on page 126.

THREE Full Sized Beams for less than the price of one.

Outstanding performance on 10, 15, and 20 meters. Easy to feed. Pre-tuned for you and cut to fit.

You just can't miss with a SKYLANE

Write for free brochure.

SKYLANE PRODUCTS

406 Bon Air • Tampa 10, Fla.

RADIO BOOKSHOP

1 **Electronics & Radio Eng. by Terman** $14.50
1078 pages. One of the most complete radio textbooks ever printed. All theory but not too heavy on math

2 **E. E. Handbook by McIlwain**
1618 pages. Mostly formulas, tables and circuits. With this, #13 & #32 you will have a complete source of data $10.00

5 **Antennas by Kraus (W8JK)** $10.50
The most complete book on antennas in print, but largely design and theory complete with the math

8 **Radio, TV, Basic Electronics** $4.95
Used as a text book by one of the top electronics schools in the country. Complete with quiz at end of each chapter.

13 **Reference Data, 4th Edition**
The IT&T handbook, 1152 pages. Data, data . . $6.00

18 **So You Want To Be A Ham**
All you need to know to get a license $2.50

19 **Short Wave Radio & Ionosphere** $2.75
A British book covering subject authoritatively. See December 1958 CQ, p. 60 for review of the book

20 **RTTY Handbook by W2JTP**
A-Z of ham teletype, supply low, very popular . . $3.00

21 **VHF Handbook by W6QKI**
Covers just about every aspect of VHF $2.95

22 **Beam Antenna Handbook by W6SAI**
Practical, includes both theory and construction . $2.70

23 **Novice Handbook by W6TNS**
Receiver, transmitter and antenna theory and construction for the Novice and Technician. Terrific . . . $2.85

24 **Better Shortwave Reception by W6SAI**
Fine handbook for SWL'ing, long needed $2.85

26 **Surplus Radio Conversion Manual I**
BC-221, 342, 312, 348, 412, 645, 946, 1068A SCR-274, 522. TBY, PE-103, etc. $2.50

27 **Surplus Radio Conversion Manual II**
BC-454-459 Xmtr-Rcvrs; APS-13; ARC-5 VHF Xmtr-Rcvrs; BC-357, 946B, 375; TA-12B; ART-13; AVT 112A; GO-9; LM; etc. $2.50

28 **Television Interference by Rand W1DBM** $1.75
This is the most complete source of info on TVI, covers every possible difficulty and the cure. Completely up to date.

32 **RCA Radiotron Designers Handbook**
1500 pages of design notes on every possible type of circuit Fabulous. Every design engineer needs it. $7.50

33 **Wave Propagation & Antennas**
As described and recommended by George Jacobs in the Propagation Column of CQ. $5.75

34 **New Mobile Handbook by W6SAI** $2.95
Worth many times the price of the book in solving all those mobile mysteries . . . noise, battery life Leece-Neville . . . etc.

35 **Command Sets Handbook** $1.50
Dozens of conversions for all of the popular and low cost Command Set transmitters and receivers: BC 453-454-5-6-7-8-9

39 **CQ's New Sideband Handbook by W6TNS**
Brand new, just off the presses. All new material absolutely no reprints like other so-called "handbooks" Dozens and dozens of built-it circuits. $3.00

40 **15th Edition (NEW) Radio Handbook by W6SAI** $7.50
This is the BEST amateur radio handbook ever published, over 800 pages and all completely NEW.

47 **Practical Electronics** $2.50
Lavishly illustrated introduction to just about every phase of electronics. Interesting to all, instructive to beginners. Great to have around the shack for visitors

48 **Basic Electronics** $9.25
Same deal as #8, only this was written by an instructor at RCA Institute for use with their electronics course. It covers more ground too.

49 **Electronic Communication by Shrader** $13.00
Same deal as #48 only written by instructor at Oakland Junior College. Biggest book of 'em all and aimed at giving all info necessary for FCC commercial and amateur licenses.

50 **Microminiaturization** $11.00
The first book on the subject. Don't see how a lab or manufacturer can be without this book. Everything going to have to be built smaller, you know.

N.Y.C.'ers add 3% Sales Tax.

Radio Bookshop

1379 East 15th St., Brooklyn 30, N. Y.

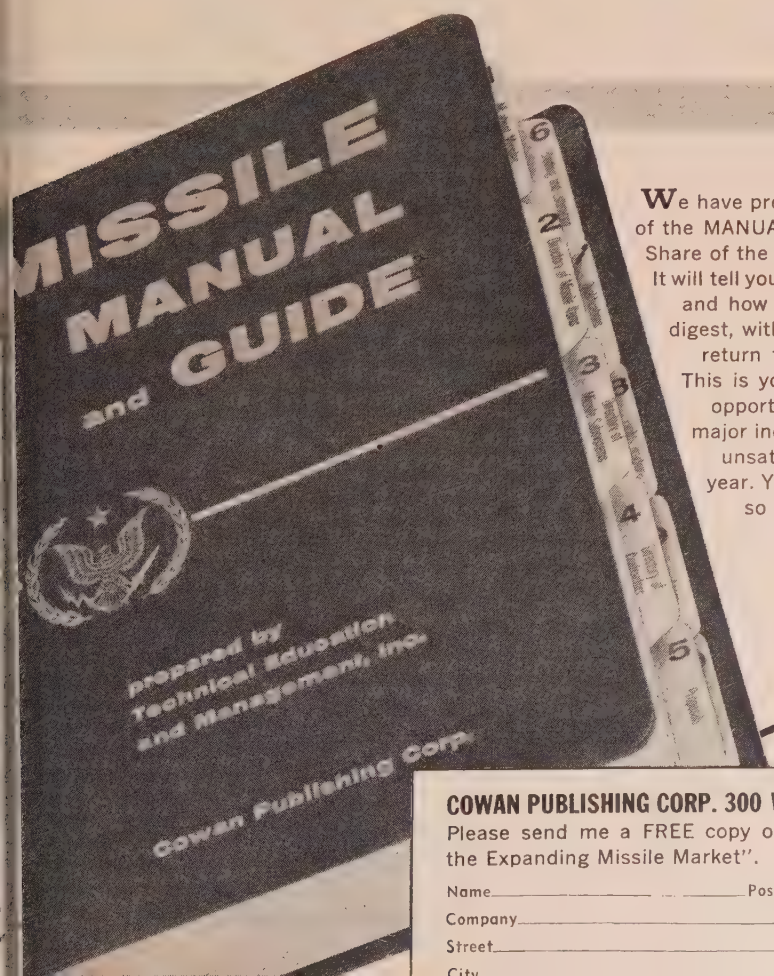
HOW TO GET YOUR SHARE OF THE 6½ BILLION DOLLAR MISSILE MARKET

During the coming year only 500 American companies will slice up the government's 6½ billion dollar missile development budget!

Yet it is estimated that more than 100,000 companies, making almost as many different products, qualify as suppliers to the missile program. Yours may be one of them.

The government, anxious to increase the number of companies supplying missile development products and services, has ordered all procurement agencies to encourage bids from every possible contractor, subcontractor or supplier. In other words, this 6½ billion dollar market is wide open!

And now there's a comprehensive, understandable "how to" GUIDE to help you get missile business—even if you've never sold to the government before! The Technical Education and Management, Inc. division of Cowan Publishing Corp. spent more than two years compiling the data for this book, THE MISSILE MANUAL AND GUIDE. It tells exactly what the government needs — paste, paper clips, paints, potentiometers, piping, and many thousands of other products—how to qualify, how to make up and submit proposals, how to bid and estimate, how to make up a facilities brochure, how to get government financing... and much, much more.



We have prepared a fast-reading digest of the MANUAL entitled "Getting Your Share of the Expanding Missile Market". It will tell you just what's in the MANUAL and how to get a copy. To get the digest, without cost or obligation, just return the coupon below.

This is your company's golden opportunity to break into the only major industrial market that is still unsaturated and growing every year. You can't afford to ignore it, so mail this coupon today!

COWAN PUBLISHING CORP. 300 W. 43rd St., New York 36

Please send me a FREE copy of "Getting Your Share of the Expanding Missile Market".

Name_____ Position_____

Company_____

Street_____

City_____ State_____

HI, O.M.! NEW GEAR ARRIVING DAILY

VISITING NEW YORK?

Come In — Browse Around

RADIO HAM SHACK'S

ELECTRONIC SUPERMARKET

ELECTRONIC PHOTOFLASH

(100 WATT SECOND)

Operates from 110v 60 cyc. complete w/gun, reflector and flash tube. Excellent condition $19.95

XMITTING VARIABLES (1750v TEST)

(Removed from New Equipt.)

3 to 8 mmfd	.49	15 to 170 mmfd	$ 1.95
4 to 28 mmfd	.49	15 to 280 mmfd	2.25
6 to 45 S.D. ADJ.	.39	33 to 435 mmfd	3.95
25 to 180 mmfd DUAL BUTTERFLY			3.95
45 to 280 mmfd DUAL BUTTERFLY			5.25

SOLENOID RELAY—FAST ACTION operates on 12/14v DC, contact rating 43 amps. NEW $3.45

MODULATOR originally designed to screen modulate a pair of 814 tubes. Will modulate any ARC-5 or similar xmitter plate modulated up to 100 watt carrier. Carbon mike input. Perfect for mobile. Removed from new equipment $3.75

METERS

2½"—0-6 amp R.F. INT. THERMO $2.95
2½"—015v DC $2.95

BC-906 FREQ. METER. Excellent grid dip and relative filed strength meter (2 meter). 140-225 MC. A real pretty toy to play with. Brand New Special .. $9.50

BC-929. A new shipment just arrived of these hot little 3" scopes. Ask the man who's converted one to general service work! New $13.95

ARR-2 RECEIVER. Fully tunable from 234-258 MC. We've sold thousands of these! Excellent condition, complete with tubes/diagram. A real buy! ... $2.95

BC-659 FM TRANSCEIVER 2 channel xtal controlled, 27-39 MC complete w/PE120 pwr supply operates from 6-12 or 24v DC. Like new condition $29.50

BC-604 FM XMITTER. 20-28 MC 10 channel Xtal controlled, 35W. less Xtals, X'lnt cond. w/tubes .. $7.95
12 Volt Dynamotor for above $9.95
24 Volt Dynamotor for above $1.95

HS-23 HEADSET. Low impedance. New $4.75
HS-33 HEADSET. High impedance. New $5.75
DM-35 DYNAMOTOR. The finest mobile medium power unit. Input 12v DC. out: 625v DC @ 225 ma. X'llnt, like new condition $9.95

A COOL KILOWATT	4X150A TUBES
W.E. 701A Tube $7.95	Tested & Gtd. $6.95

BC-422 ARC-5 ANTENNA relay unit. Contains RF ammeter, 12v RF relay and vacuum condenser. Perfect condition. A real good buy! .. $3.95

BC-611 The famous **HANDY TALKY.** Chassis only. Less tubes, xtals, coils. Brand new $7.95

T-17 MICROPHONE. "The thinking ham's mike." New. $8.95

I-82A Bendix instrument panel indicator used in airborne RDF. Selsyn operated, 360° scale. Either 46v 400 cyc or 28 v 60 cyc with duplicate selsyn. 5" dia. New condition $4.95

I-81A Same as above except 3" diameter $3.95

I-208-D FM SIGNAL GENERATOR. Operates from 12v DC or 115v 60 cyc AC. Freq: 1.9 to 4.5 mc and 19 to 45 mc. Accuracy .03 percent. Generates five audio frequencies. Cost the gov't about $1800.00. A real must for the mobile shop! Brand New. Latest model. ONLY $149.50

TUBES TUBES TUBES TUBES TUBES

We carry a complete line of receiving, transmitting and special purpose tubes, much too numerous to list here. Hams, Schools, Experimentors, Industrials, Servicemen, send us your requirements. We will mail our latest listing. You'll be pleased at our low prices and excellent service.

Mail orders filled promptly. All prices F.O.B. New York City.

Radio Ham Shack INC.

66 DEY STREET, NEW YORK 7, NEW YORK

For further information, check number 60 on page 126.

Announcements

Ottawa, Canada

The Boy Scouts International Bureau in Ottawa, Canada, has announced the Second Annual Jamboree-on-the-Air, to start 0001 GMT October 23 to 2400 GMT October 25, 1959.

Members of the Boy Scouts who are radio amateurs are invited to participate, exchanging Scouting greetings and messages. This is not a contest and there is no prescribed exchange. Operations will be on authorized amateur bands.

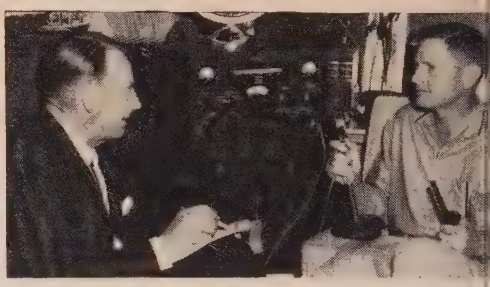
The International Bureau will operate a station which will QSL all contacts with a special card.

K2BFW, The BOYS' LIFE Radio Club station will also send special QSL's to all stations worked and to SWL's submitting reports.

For further information write Harry A. Harder, W2GND, editor of BOYS' LIFE and coordinator for Radio Boy Scouts of America.

Lions

Lion Tamer Hal Atwood and amateur radio operator K. L. Dixon (right) are shown at station K7AIC. These two have been instrumental in the formation of a Lions group at KC4USN and at the New Zealand Base in the Antarctic. Both Antarctic groups are now branches of the Forty-Niners of Las Vegas.



The KC4USN gang, with the help of Lions Clubs throughout the world, are presently engaged in a program to send a personal greeting to crippled children who are confined to hospitals. Amateurs are being requested by KC4USN to contact local Lions Clubs to obtain names of crippled children and to arrange to handle traffic, 'phone patch, tape recordings or ham-gram wherever possible.

Lions or Amateurs who desire further information may write to the "Forty-Niners" Lions Club at 1 Chapparal Road, Las Vegas, Nevada.

Ben Hoffman, Secretary

WOC 50

Millie Simson, VE3EII, of Reddindale, near Kingston,

Ontario is the winner of W.O.C. 50 Certificate number 1 and to get this award, submitted QSL's verifying

[*Continued an page* 92]

"the house the hams built!"

During 23 years of amateur radio business, we've built up an enviable reputation of maximum service at minimum cost on a personalized basis. We invite you to join the thousands of amateurs that are currently doing business with "the World's Largest Distributor of Amateur Radio Equipment!". We finance our own paper, so terms are the easiest. Our reconditioning department allows the best trades on new equipment, as well as the best buy in used gear. We handle the nation's leading lines with large stocks to continually offer you what you want. Try us the next time you buy, won't you?

Leo I. Meyerson, WØGFQ

- Only 10% Down; Up to 24 Mos. to Pay
- Top Trade Values. Get a Quote From Us
- More Than 1000 Reconditioned Items
- Latest Serial Numbers
- Fast Shipment From the Center of the U. S.
- Personalized Service

NOW, NET . . . $139.95

$14.00 down $8.05 per mo.

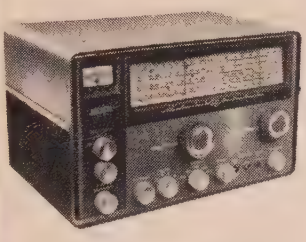
Matching Speaker: $17.50

National NC-188

General coverage receiver 540kc - 40mc, also calibrated bandspread for 10-80M. 12" slide rule dial. Sensitivity under 2.5mv (10db signal/-noise ratio), with 9 tubes including rectifier. Gang-tuned RF amplifier stage for increased sensitivity and image rejection. 540kc - 40mc in 4 bands. Two IF amplifier stages and two audio stages with tone control. Separate high frequency oscillator tube. Series type noise limiter. Oscillator temperature compensated and ventillated for increased stability. Receives AM, CW and SSB. BFO provided for CW and SSB. Antenna trimmer.

NEW LOW NATIONAL PRICES

Even More Value per Dollar from World!



NOW, NET . . . $169.95

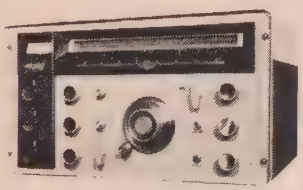
$17.00 down $9.78 per mo.

Crystal Calibrator: $20.95

Matching Speaker: $17.50

National NC-109

General coverage receiver with exclusive "Microtome" crystal filter. "S" meter. Covers 540kc - 40mc in four bands including broadcast, AM, CW, DSB and SSB. Calibrated bandspread for 10-80M. 12" indirectly lighted lucite slide rule dial. 11 tubes including rectifier and voltage regulator. Accessory socket for external adaptors and other devices. Gang-tuned RF amplifier stage, two IF and two AF stages. Antenna trimmer and tone control on front panel. High frequency oscillator tube increases stability. Temperature compensated. Series type automatic noise limiter. Antenna input: 50-300 ohms.



National NC-303

Dream Receiver with front panel DSB, SSB selector for instant sideband choice. "Q" Multiplier. 5-position IF selector for DSB, SSB, CW, Fone, Fone Net and VHF. Hi-speed 40-1 tuning dial with logging scale. Image rejection 50-80db all bands. Dozens of other features.

JUST $449.00

$44.90 down - $25.50 per mo.

FREE 1960 CATALOG

JUST OFF THE PRESS! THOUSANDS OF HAM - HI-FI - SERVICE BARGAINS

Rush me your new 1960 Catalog ☐ . . . and complete info on the National Line ☐. Send your latest Reconditioned Equipment List ☐

WORLD'S MOST PERSONALIZED ELECTRONIC SUPPLY HOUSE

World Radio LABORATORIES

PH 2-0277

ELECTRONIC HEADQUARTERS

3415 W. BROADWAY COUNCIL BLUFFS, IOWA

NAME:

ADDRESS:

CITY & STATE:

For further information, check number 59 on page 126.

Now It's Easy to Make Your Own

CODE PRACTICE OSCILLATOR

2 x 3" Board. Solder in a 2N109 plus a few other easily obtainable components to produce your own inexpensive transistor oscillator. Can also double as an audio generator to aid in the alignment of SSB exciters. $1.50 each.

100KC Frequency Standard

This 2½ x 3" board supplies the basis for a compact standard which can be tucked away in most any corner of your receiver — Transistorized (2N109), self powered unit. $1.95 each.

Clipper-Filter Speech Amplifier

Uses 2 — 12AX7's plus some simple components available at any distributor to provide an effective audio package on a rugged 5½ x 3½" printed board — and you build it! Only $3.75 per board.

VHF Transmitter

Build your own transmitter by adding a 6U8 osc. — amp and a 6AQ5 modulator, plus some simple circuitry. 7" x 5" units can be constructed for 10 meters, 6 meters or Citizens Band. $5.95 per board!

VOX TRANSMITTER CONTROL

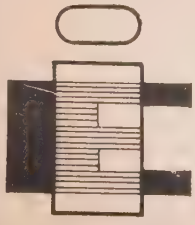
Since we know you want to be up to date by having voice control in your exciter, we have a printed circuit board which does just this. Designed around a 12AT7, 6AL5 & 12AU7. 4½ x 5" — $4.75 each.

Mailed postpaid anywhere in USA.

All units supplied with complete instructions including circuit diagram & construction procedure.

No special components required for our units.

Practice board supplied with every kit to facilitate error free construction — transistor or PC tube sockets also supplied as required.



IRVING ELECTRONICS CO.

Irving, W5UB

P.O. Box 9222 San Antonio 4, Texas

Manufacturers inquiries invited on our printed circuit prototype and production service.

For further information, check number 19 on page 126.

SSB *satisfactions and challenges at* REL

If you are a graduate engineer or amateur with equivalent experience specializing in the design, development, and construction of communications gear, the outstanding Single Sideband design team being built by REL's Eldico division may have a place for you.

Exceptional potential in this rapidly-expanding sector of communications is combined at REL with especially desirable working and living conditions. At this communications pioneer, engineers enjoy their association with those who have made and are making outstanding contributions. Engineers here are not confined to a single, narrow slot, but are encouraged in well-rounded diversification of activities within their area of interest.

The new plant, with its air-conditioned offices, is in Long Island City—only three miles from the Empire State Building, with all the cultural, educational, and recreational opportunities of the Capital City of the World. Whether you prefer an apartment or secluded private house, it can be yours on celebrated Long Island.

Please address your resumé to *S. E. Piller, W2 KPQ, Group Supervisor, Eldico Electronics Division.*

ELDICO

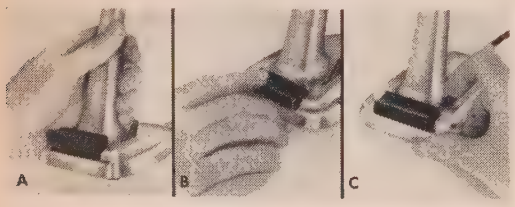
Radio Engineering Laboratories·Inc

Dept. C · 29-01 Borden Ave · Long Island City 1, NY

Turner Model 250 with "Triple-Switching" versatility

Turner's Model 250 gives you the ultimate in operating convenience. You can transmit simply by lifting the microphone or depressing the push-to-talk bar. For longer transmissions, simply pull the lever-lock switch forward. The push-to-talk bar stays depressed 'til you push the switch back.

The Turner Model 250 is wired to operate both mike and relay circuits at a touch. The 250 is a high impedence mike with smooth response from 60 to 10,000 c.p.s. Output level of −52 db.



A Lift the mike, it's live. Additional switch in base deactivates lift switch when necessary.

B Depress the front bar for push-to-talk. Gives "inter-com" convenience in a microphone.

C Move the Lever-Lock switch forward. The mike **stays** live. Both hands are free for work.

Price — $49.50 list

For complete information and specifications see a Turner dealer or write today to:

THE TURNER MICROPHONE COMPANY
925 17th St. N.E., Cedar Rapids, Iowa

IN CANADA: Canadian Marconi Co., Toronto, Ont. & Branches
EXPORT: Ad Auriema, Inc., 85 Broad St., New York 4, N.Y.

For further information, check number 62 on page 126.

ANNOUNCEMENTS [*from page* 88]

way communication with Amateurs in 50 of the 56 counties and districts of Ontario.

The 'Worked Ontario Counties' certificates are issued by the METRO Amateur Radio Club of Toronto, Ontario, which sponsors the award. There is also a W.O.C. 30 certificate which is a stepping stone to the higher award.

Further information may be obtained by writing to the Club at 570 Eglinton Avenue West, Toronto, or to the Contest Co-ordinator, Rick Bradley, 82 Forman Ave, Toronto 7, or to the writer, at the above address. Rules governing the award, as well as a list of Ontario counties are enclosed.

73, A. H. Brown, VE3DSM

LETTERS [*from page* 20]

in the November "CQ". I certainly hope we can somehow revive the old time "Ham", who was something more than a "Citizen's Radio" type of individual. Although I am President of the Radio Club this year, I often feel that I am presiding over a club with an entirely different hobby from mine, and have no more business there than I would presiding over a Stamp Club meeting. I retreated to the VHF bands long ago, because I could find guys there who even built their own equipment!! With the swarm of Technicians on 50 mc. now, I have about decided to move up to UHF, again searching for the old type Ham.

"CQ" is getting bigger and better all the time—congratulations.

W4??

Allocations

Dear Wayne:

Your editorial in the February issue of CQ, dealing with frequency allocations has set me to thinking and I am wondering if you have any thoughts on what can be done at this stage of the game. Granted, that this is a job for the League, I wonder if it is about time for us to consider an aggressive group who will get in and pitch for the amateurs and drag some public opinion into it. Let's call it a Freedoms Fight group, if you want it, but I am thinking about a group that would actively support a lobby in Congress, the FCC and at some of the international affairs. I think a properly organized group would receive a lot more support than might be first apparent with some generous contributions, probably on a voluntary basis. If we can't build a fire under the League, let's look for some other way out.

I am anxious to be kept posted on the situation and what might be done to correct it.

Sincerely yours,
The Forman Company
Bob Forman

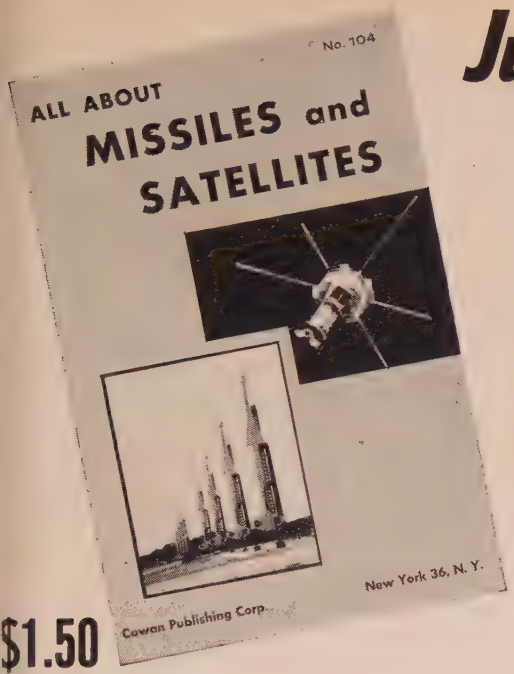
VHF [*from page* 58]

see, this time concerning six meters, via Mike Usdan (K4PEV). "I've been reading your VHF Department for quite a while and thought I'd better put my two cents in." *All contributions gratefully accepted.*

"I've been a technician for about a year and my furthest DX is XE2WC in Tijuana, Mexico. I worked him on June 12th. Since I've been on six I've heard about forty states

Missile-Bug Got You?

Just Out!



$1.50

ALL ABOUT MISSILES & SATELLITES is the answer to your problems! Here's a book, written in down-to-earth language, which answers questions on missile maintenance, fire control, flight control tracking, testing, fuels, payload and many other achievements in rocketry and space for both scientific and military applications. Also, featuring the most up-to-date "Directory of 38 Most Popular Missiles and Their Photos (supplied by Department of Defense)", as well as a "Glossary of Missile Terms."

CONTENTS

1 Introduction
2 The Story of Missiles
3 What is Meant by "Missiles" Today
4 The Airframe and Missile Flight
5 The Propulsion System
6 Military Nose Cone
7 Guidance Systems
8 Directory of Missiles
9 Introduction
10 In Orbit
11 Orbits
12 Launching Satellites
13 Atlas Satellite Launcher
14 Earth Satellites
15 Space Travel
16 Near Future-Manned Satellites, Space Stations and Moon Bases
17 Glossary of Missile Terms

ORDER YOUR COPY TODAY!

AAM & S is GOOD READING for ALL; technically-minded people interested in entering the missile field, HAMS and laymen who are of an inquisitive nature, as well as High School students and guidance counsellors who are interested in the career potential developed by the Missile Industry.

This book has been reviewed and tech-edited by the finest brains in Military and Civilian Astronautics, as well as the Science Directors of numerous Boards of Education facilities. All have found this book worthy and essential to the better understanding of Missile Operations.

96 Pages of HIGHLY ILLUSTRATED AUTHENTIC Text, including DIRECTORY of 38 LATEST MISSILES—ALL for ONLY—$1.50.

C9

COWAN PUBLISHING CORP.

Dept. MS
300 WEST 43rd ST.
NEW YORK 36, N.Y.

Sirs: I enclose $..... for which send me ..... copies of "All About MISSILES and SATELLITES" at $1.50 each, postpaid.

NAME .....

ADDRESS .....

CITY ..... ZONE.....

STATE .....

New York City Residents Add 3% Sales Tax

For further information, check number 24 on page 126.

"CALL ME
for
Personal Service"

ON

Bob Henry
WØARA
Butler, Mo.

Ted Henry
W6UOU
Los Angeles

HAMMARLUND

HQ-170

Single Sideband at Its Very Best!

Triple conversion **HQ-170** • 20 monthly payment $17.77. $35.90 down. CASH PRICE $359.00. Radio amateur's ideal for modern SSB reception in performance, tuning techniques, dependability. Clock timer $10 extra.

HENRY HAS THESE HAMMARLUND ITEMS IN STOCK FOR IMMEDIATE SHIPMENT

HQ-145 RECEIVER	$269.00
HQ-110 RECEIVER	249.00
HQ-160 RECEIVER	379.00
HQ-100 RECEIVER	189.00
MATCHING SPEAKER	14.95
CLOCK TIMER	10.00

Complete stock of all transmitters, receivers, antennas, rotators, towers, parts, accessories, equipment. Henry has ALL the new equipment first.

PRICES SUBJECT TO CHANGE
TRADE — CASH — TERMS

WRITE, PHONE OR VISIT EITHER STORE TODAY

BIG Trade-Ins!

Henry Radio Stores

Butler 1, Mo. ORchard 9-3127
11240 West Olympic Los Angeles 64 GRanite 7-6701

For further information, check number 63 on page 126.

but have only twenty-eight states confirmed

"One night recently I heard a KH6 com in but he faded right out."

"My rig is a Globe Scout 680 and an HQ11 and an eight element hy-gain about forty fe up."

"Ground wave has been coming in fro Alabama several nights this past month and have talked to Homer (W40ZK) in Uni Grove, Alabama several times. This afterno I heard VE3's coming in. Finally worked tw of my longed for states, Delaware and Rho Island." *Guess that makes thirty confirm for you now Mike. Keep with it, you'll g the rest of 'em.*

Oakland California Now that we have to d pend on the mail to hear from Californ we hear from Bob Grimm (K6RNQ) tha "Haven't been very active lately, just acti enough to work WØGNS in Minot, Nor Dakota, on 6/12/59, to complete my 49 sta WAS before the July 4th deadline for Hawai

"F was lousy this spring, only caught o South American opening in February and on 5 openings to ZL. *ONLY FIVE!* The ZL being above 51 *mc* makes it a little rough *Nice to hear from 6-land again Bob, but ma be if you were more active you'd catch ma openings. But then, who knows, on six.*

Rochester, New Hampshire Tim Morrill (K GBI) has a problem: "I've been on six mete for about a year now and have enjoyed eve minute. But, I have a problem. I started wi the idea of operating exclusively cw but (y probably know already) I got lonesome. don't know of more than five stations th operate cw regularly in New England, Ne York and New Jersey. When I have heard c stations on, I have had very good luck (r cently W7JRG and WØDNW)."

"I run 50 watts to a home brew 6146 i into an eight element hi-gain beam. Recei on an old converted communications receiver

"I would like ground wave skeds in t late evenings on *cw* with stations between 1 and 400 miles distant. I think the boys ha the *cw* equipment but just don't use it." *O you fellows who need New Hampshire, wh don't you listen to those cw signals! Hope y get the skeds you'd like, Tim, and good lu with them.*

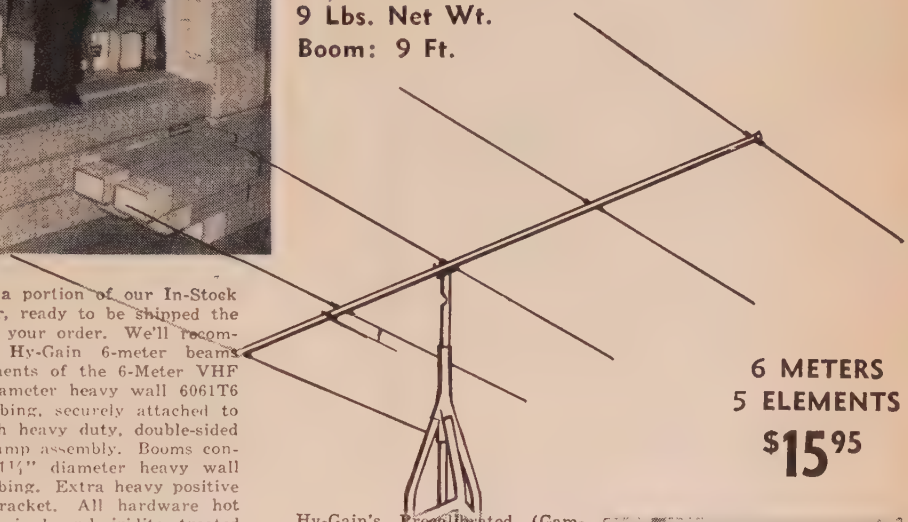
Las Vegas, Nevada From far-off Nevada w hear from Al Olcott (K7ICW) that: "Until r cently my call was K6PBW, Sepulveda, Ca fornia Since May 31st however, my new c K7ICW has made its appearance on several the VHF bands. For those who need Nevada f 50 *mc* WAS, I will be glad to oblige with a co tact. CW is not unknown here, and I have 6 watts to poke through here and there. Also a fortunate enough to have one of the bett known receivers for schedule work. (75A-3)

"220 *mc* is making steady headway in th part of the country, and W7LEE Parke Arizona and myself have both heard each oth

ABSOLUTELY TOPS !

the hy-gain 6 METER ARRAYS

9 db Gain
9 Lbs. Net Wt.
Boom: 9 Ft.



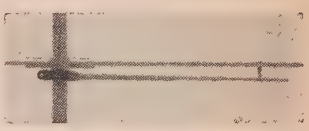
6 METERS
5 ELEMENTS
$15.95

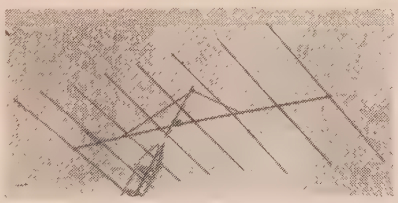
Here is just a portion of our In-Stock Hy-Gain gear, ready to be shipped the same day on your order. We'll recommend these Hy-Gain 6-meter beams highly. Elements of the 6-Meter VHF are 7/16" diameter heavy wall 6061T6 aluminum tubing, securely attached to boom through heavy duty, double-sided aluminum clamp assembly. Booms constructed of 1¼" diameter heavy wall aluminum tubing. Extra heavy positive mast grip bracket. All hardware hot dipped galvanized and iridite treated for maximum weather ability! ONE FULL YEAR GUARANTEE!

We always stock late serial number gear from the Nation's leading manufacturers. Trade-Ins, too, are our strong suit;- you can expect the best offer in the industry. Because of our large trade-in market, and our expert reconditioning department . . . used equipment, too, is available at top bargain. You can save up to 50%.

An Easy pay plan with only 10% down makes it easy to buy from World Radio. Let us make you an offer the next time you buy. Discover for yourself why World Radio is "the house the hams built!"

Hy-Gain's Precalibrated (Gammaxial) Gamma Match assembly with coaxially formed reactance cancelling capacitor built in, makes possible for the first time a perfect 1:1 SWR.



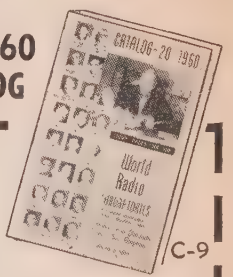


6 METER
8 ELEMENTS
12 DB GAIN
18 LBS. NET WT.
BOOM: 18 FT.

$26.95

Complete Hy-Gain Line In Stock

FREE 1960 CATALOG



DEAR LEO: PLEASE RUSH FREE CATALOG ☐ AND COMPLETE INFO ON THE HY-GAIN LINE. ENCLOSED IS MY CHECK OR MONEY ORDER FOR THE 6M, 5E_____; 6M, 8E_____

C-9

WORLD'S MOST PERSONALIZED ELECTRONIC SUPPLY HOUSE
World Radio LABORATORIES
PH. 2-0277
ELECTRONIC HEADQUARTERS
3415 W. BROADWAY COUNCIL BLUFFS, IOWA

Name: _____

Address: _____

City and State: _____

For further information, check number 25 on page 126.

READ THESE NEW HANDBOOKS!

The first and only complete handbook devoted to the very high frequency spectrum. 12 chapters . . 208 pages . . with brand new antenna facts. Moon reflection transmission data.

VHF HANDBOOK

by William I. Orr, W6SAI
and Herbert G. Johnson, W6QKI

The VHF HANDBOOK covers in detail the generation, propagation, and reception of VHF signals, plus the construction and design of equipment and antennas. A complete summary of state of the art!

Here it is! A radio handbook, written for the Novice and Technician radio ham! This book helps you with the code—helps you build your rig—and gets you on the air!

NOVICE AND TECHNICIAN HANDBOOK by

William I. Orr, W6SAI
Donald Stoner, W6TNS

The first radio text entirely devoted to the amateur newcomer! Covers transmitters, receivers, antennas in step-by-step, easy to follow instructions. Written so you can understand it! Get your copy!

Entirely devoted to the construction, adjustment and installation of rotary beam antennas! This book will make your antenna work! Eliminate guesswork in your new beam!

BEAM ANTENNA HANDBOOK

by William I. Orr, W6SAI

Complete and concise information about beam antennas. Dimensional charts, SWR data, and construction data on parasitic arrays for the 6, 10, 11, 15, 20 and 40 meter amateur bands! Invaluable!

Now! This all new handbook covers the complete shortwave field for the SWL and ham!

BETTER SHORTWAVE RECEPTION

by William I. Orr, W6SAI

How to hunt DX! How to get verification cards! "Do-it-yourself" radio projects! How to buy a second hand receiver! DX tuning hints! Jam-packed with data! Order your now!

RADIO PUBLICATIONS, Inc., Wilton Conn.

Please rush____copies of VHF HANDBOOK at $2.95 per copy
____copies of NOVICE AND TECHNICIAN HANDBOOK at $2.85 per copy
____copies of BEAM ANTENNA HANDBOOK at $2.70 per copy
____copies of BETTER SHORTWAVE RECEPTION at $2.85 per copy

Enclosed is 15c per book (covers packing, shipping cost). (Cost prepaid on three or more books).

Name_____ Call_____

Street_____

City_____ State_____

Enclosed find: ☐ check ☐ cash ☐ money order

For further information, check number 26 on page 126.

No two-way QSO so far. Also the boys in L have heard me. Will gladly schedule anyone a 500 mile radius."

"Local activity on six meters consists W7JU, Boulder City, W7RBV and K6LGP Two meters is used by approximately 10 tions, three are horizontally polarized. (*???*) Nothing above 220 *mc.*"

"My QTH is not listed in the Call B as yet, so-oo-o—Al. Olcott, K7ICW, 488 Drive, Las Vegas, Nevada." *Another ac Nevada station will surely help out the g Al. Hope you have lots of contacts.*

CITIZENS [*from page 61*]

communications.

(c) Here the number of units you intend to operate should be inserted. It may be as many as you choose. Class D stations are licensed as mobiles *only, though they may be operated at fixed locations as well.*

Item 2. —*(a) Sign your name as you normally do.*
(b) No problem here.

Item 4. —*This is the class of license for which you are applying.*

Item 5. —*All the FCC wants here is a general idea as to the area in which you intend to operate.*

Item 7. —*Check "Individual" if station is for your own private and personal communications.*

Item 8. —*(a) If the answer is "NO" you must give name of owner.*
(b) If you answered "YES" to 8 (a) no answer is required here.
(c) The answer here must be "YES" since the regulations require you to maintain control of the operation of the station at all times.

Item 9. —*A statement like the one shown is sufficient. However you may have a different use in mind.*

Item 11.—*An amendment to Part 19 dated September 17, 1958 provides only for crystal-controlled transmitters. Answer must be "YES."*

The carbons may now be discarded. Be s to retain your work sheet.

Finally, be sure to sign the application check "Individual Applicant," if it applies the presence of a Notary Public.

[*Continued on page 100*]

Wherever you are...

Harvey and RCA are ready to serve you

At any point on the globe, from Durban to Dawson, from Bremen to Buna Buna, Harvey Radio's 31 years of service and reliability is with *all hams—regardless of location.*

At Harvey's, all orders for ham equipment are personally supervised and handled in all phases by hams. W2DIO and his ham associates devote immediate attention to your order. Your instructions—in any language—are followed meticulously. The items called for are drawn from Harvey's large up-to-date inventory and are carefully rechecked against your order. Harvey's rapid turnover is your assurance that only the very latest models are shipped.

Upon your instructions, Harvey's will open the original factory sealed cartons and give the equipment complete inspection and checkout. And there is no charge for this extra service, for Harvey's policy is "satisfaction always guaranteed."

Intimate daily working knowledge with overseas shipping requirements enables Harvey to provide the proper protective packaging and crating as well as all necessary forms and paperwork.

Hams around the world know that Harvey means confidence and RCA means dependability. Always ready to discuss your ham problems, always ready to supply your exact requirements—Harvey talks the language of hams—wherever they are.

hrc RCA Authorized Distributor

Harvey Radio carries a complete stock of RCA tubes for every power tube requirement.

Partners in Dependable Global Service

ESTABLISHED 1927

HARVEY RADIO CO., INC.

103 WEST 43rd STREET, NEW YORK 36, N. Y. • JUdson 2-1500

For further information, check number 27 on page 126.

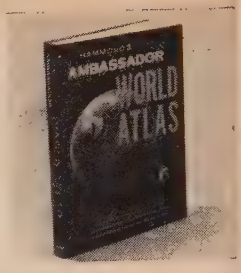
THE HAM SHOP

19" GLOBE

Here is a chance to preserve your breath for posterity! This beautiful World Globe, made by Hammond, is a must for every hamshack. Plain for $19.95 or lighted for $24.95. The first 10,000 people who jump at this bargain will get a year of CQ at no extra charge.

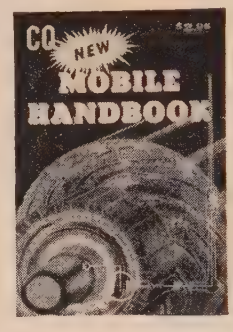
ATLAS

What! You don't know where Nicobar Island is? Incredible! And with the CQ deal on the Hammond Atlas so reasonable too. This is a reference book that will get good usage around your house if you have any kids. 7 lbs of colored maps and a gazetteer for only $12.50 . . . and you get a year of CQ.



COMMAND SETS

This IS a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous amazing terrific pages for only $1.50 PPD.

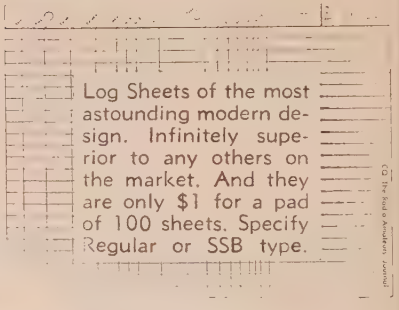


MOBILE HANDBOOK

Anyone who tries to go mobile without getting this book should register for a sanity hearing. Bill Orr, W6SAI has put everything you need to know in this book . . . it is NOT a collection of reprints like some other mobile handbooks we could mention. Build-its by the dozen . . . solutions to ignition problems, keeping the battery charged, noise . . . only $2.95 postpaid.

CODE RECORD

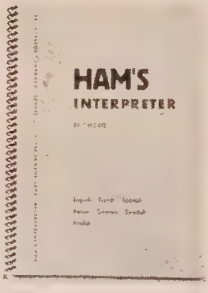
Learning code is a snap with this record. Speeds from 3 to 16 WPM, depending upon turntable speed. This 12" LP record has on it all you need to learn the code for both the Novice and General license. $3.50 each.

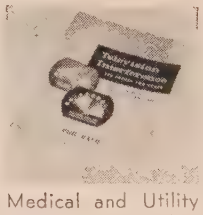


Log Sheets of the most astounding modern design. Infinitely superior to any others on the market. And they are only $1 for a pad of 100 sheets. Specify Regular or SSB type.

HAM'S INTERPRETER

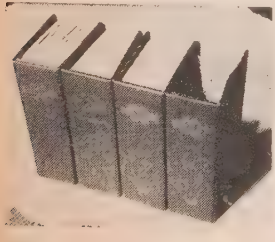
Now you can talk in broken French, Spanish, Italian, German, Swedish and Finnish. This handy little book gives all the popular ham conversation in seven languages, including letters and numbers. Only $1.50 postpaid.





TVI HANDBOOK

W1DBM's newly written TVI book (no reprints) covers all aspects of curing TVI from both the Ham's viewpoint and that of the TV viewer or the TV serviceman. It includes 2 and 6 meter TVI as well as Industrial, Medical and Utility TVI. Profusely illustrated with diagrams, photos, charts, tables and FCC regulations pertaining to radio and television interference. Price: $1.75 postpaid, USA, $2.00 Foreign.



BINDER

There is no other good way to keep your back issues. Make 'em neat. We supply the binder, with the year embossed in gold, not merely a sticker which will come off later. Specify what year you want stamped on your binder. $3.50 each

BOUND VOLUME

By far the handiest way to keep your library. Why not go first class? This impressive volume is only $10.00. We only made a few of them this year, so don't expect to get one later.

CQ ANTHOLOGY

Down through the years CQ has had the honor of being there first with just about every major discovery in the amateur radio field. Unfortunately most amateurs do not have a good file of back issues of CQ to fall back on when they are interested in building up something or in improving their equipment. So we've looked back through the years 1945-1952 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out and are unavailable. The price is a paltry $2.00.

SERVICE DEALER
ELECTRONIC SERVICING

Television SCHEMATICS
and SERVICE GUIDE

Including: Alignment Data, Waveforms, Tube Location Guide, Operating Voltages, Essential Parts Numbers, etc.

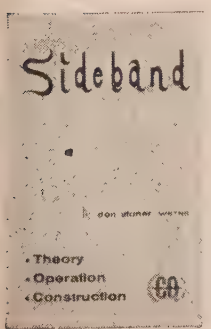
TV SCHEMATIC PACKET

96 Pages of 45 representative TV schematics, covering the most prominent TV manufacturers. Factory authorized, crystal clear and accurate. $3.00

HI-FI BOOK

This nifty volume contains the latest dope on amplifiers, pre amplifiers and equalizers plus a buyer's guide of component manufacturers!

Over 150—5½ x 8½" pages of heavily illustrated descriptions covering Hi Fi Audio Components — the greatest publication value in its field today. Only $2.50 per copy



SIDEBAND HANDBOOK

Written by Don Stoner, W6TNS, was almost one full year in the preparation of this terrific volume. This is not a **technical** book. It explains sideband, showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers. Price, only $3.00.

C-9

COWAN PUBLISHING CORP.
Book Division
300 West 43rd St.
New York 36, N. Y.

LIGHTED GLOBE	$24.95	☐
UNLIGHTED GLOBE	19.95	☐
ATLAS	12.50	☐
COMMAND SETS	1.50	☐
MOBILE HANDBOOK	2.95	☐
CODE RECORD	3.50	☐
REGULAR LOG SHEETS (100)	1.00	☐
SSB LOG SHEETS (100)	1.00	☐
HAM'S INTERPRETER	1.50	☐
TVI HANDBOOK	1.75	☐
BINDER—YEAR WANTED	3.50	☐
BOUND VOLUME	10.00	☐
CQ ANTHOLOGY	2.00	☐
TV SCHEMATICS	3.00	☐
HI-FI BOOK	2.50	☐
SIDEBAND HANDBOOK	3.00	☐

SIRS: My check (money order) for $..... is enclosed. Please send the following items to:

Name_____

Address_____

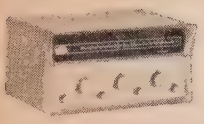
City_____ Zone_____ State_____

New York City Residents Add 3% Sales Tax

CALL ME TODAY
FOR A SWELL
DEAL ON
THIS GREAT
GEAR FROM

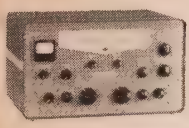
GONSET

STAN WØBJV



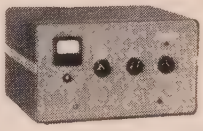
G-43 ALL BAND RECEIVER
Offers peak reception over a wide frequency range . . . sensitivity . . . selectivity . . . highest quality components and materials . . . a fine blend of high performance features and economical pricing. $159.50

G33 ALL BAND RECEIVER
Has the same basic features as G-43, but incorporates certain design simplification which permits exceptionally reasonable pricing with little sacrifice in performance. $89.95



GSB-100 SSB TRANSMITTER
The GSB-100 operates on SSB with selectable sidebands. When used on AM, it transmits both sidebands, which makes 100% modulation possible without the distortion that accompanies highly modulated carrier-and-one-sideband signals when received on a conventional AM receiver. $479.50

GSB-101 LINEAR AMPLIFIER
If you've been reading a lot of claims about **input** these days, consider what you're really getting in down-to-earth watt-per-dollar **output**. Only **Gonset's GSB-101 Linear Amplifier gives you up to 65% efficiency!**.....$439.50



GONSET HYBRID PHONE PATCH
Gonset's New Hybrid Phone Patch has an exclusive VU meter that permits easy monitoring of phone line levels and eliminates overdriving them, a cause of so much cross-talk and interference in the past. The Gonset Hybrid Phone Patch gives you a positive method of measuring your level, from —20 db to 3 db. $44.50

Burghardt RADIO SUPPLY, Inc.

P.O. Box 746
Watertown, S. Dak.
Turner 6-5749

For further information, check number 28 on page 126.

CITIZENS [*from page* 96]

The completed application should *not* be sent to the local FCC office. It should be sent to the Federal Communications Commission, Washington 25, D.C.

At the present time, it is understood that there is approximately a 70 day back-log. Don't write the FCC. They're unable to tell you at what stage in the processing your application might be, and it just takes further administrative time to tell you this. If you want to be on the air this winter get your application and copy of Part 19, now.

In future columns some of the less obvious aspects of the Citizens Radio regulations will be discussed.

73, Lee, W2QEX

SURPLUS [*from page* 64]

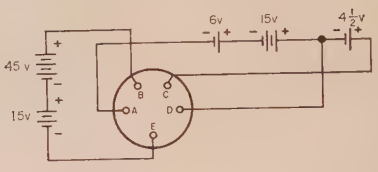


Fig. 3—Replacement for the BA-41 used in the BC-659.

Mail

The mail this month is extremely light . . . so light that it doesn't even exist. Probably this is due to vacations and other things to do in the nice summer weather. Nevertheless, we are still in business and will be only too glad to publish any requests for handbooks that you may have. Our ad department won't let us scout up equipment for you, but handbook requests are OK. We haven't heard of anyone not getting results from the column, so we are pretty confident that the results are satisfactory.

73, Ken W2HDM

YL [*from page* 71]

raphy is one, but she was unable to work in the dark room for any length of time. Unable to participate in the more active hobbies of her OM and daughter (hunting, fishing and archery), Winnifred has welcomed Ham radio. Most of her operating is mobile from the hand-controlled station wagon she drives which has Gonset wins installed in it. Eileen operates whenever she can, but studying comes first. 20 years old, she is a senior at E. Montana College of Education, majoring in math. Also an accomplished marksman, she is president of the Campus Rifle Club. Eileen likes to cook and sew, collects stamps, matchbooks, coins and

salt-pepper shakers. She put together a Heathkit Mobile so she could operate portable from Hawaii this summer where she planned to visit friends.

Another mother/daughter YL team—9-year old Peggy is WV2EEC and her mother, Ann Zmetronak, is WV2EEB. Proud OM and father, W2MHL, says both YLs could copy 15 wpm after several weeks of practicing 15 minutes *every evening*. Ann and Peggy are on 80, 40, 15 and 2 meters.

"CQ YL"

No telling where this book will turn up next! At the Pacific Div. Convention, San Jose, July 4th weekend, W1TSN, ARRL prexy, had W6DXI announces at the dance that he and W5DEW, Mary, had set July 31 as the "hitchin' date." So the next a.m. at the SWOOP breakfast the gals made Mary, the bride-to-be, a member of SWOOP by proxie, the new SWOOPs acting as stand-ins. The groom-to-be held a copy of "CQ YL" open to the page with W5DEW's photograph (p. 80) and went through the ceremony, too! Then all the gals autographed the "CQ YL" and sent it on to W5DEW as a gift from SWOOP-BAYLARC.

Now you may not get your copy of "CQ YL" in such a romantic fashion! But if you don't yet have your copy, order from this column editor, W5RZJ (QTH at head of column). The only book about the YLs, 169 pages, over 500 photographs, it covers all aspects of YLs in Ham radio. Price $3, postage paid.

33, Louisa W5RZJ

TRIPLER [*from page 54*]

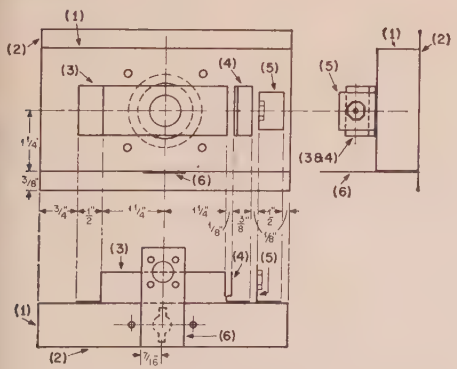
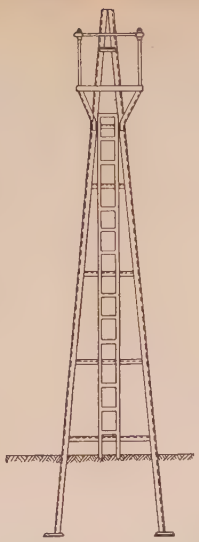


Fig. 15—Partial assembly. Bracketed numbers refer to Piece numbers. Soft solder pieces together.

rease the loading by rotating the output coax onnector, re-dip the plate current, and so forth ntil the proper plate current is flowing. The late current dip was found to correspond exactly to maximum output. During operation, no race of instability has been found.

No Guy Wires!



VESTO Hurricane-Proof* TOWERS

Completely Self-Supporting! No Guy Wires . . . Supports Heaviest Arrays!

10 SIZES

22 Ft. to 100 Ft.

EASY TO ERECT!

ATTENTION HAMS — Buy the tower the airports use . . . no need to crank down before a storm.

1. 4-leg construction for better balance—greater strength.
2. Safe steel ladder from ground to platform near top.
3. Safety platform with metal railing and trap door (optional).

***NO VESTO TOWER HAS EVER BEEN DAMAGED BY HURRICANE!**

Easy Payment
Write for complete FREE information and prints.

VESTO CO., INC.
20th & Clay St.
North Kansas City, Mo.

For further information, check number 29 on page 126.

BACK ISSUES FOR SALE

1950—Jan., July, Oct., Nov.
1951—All issues, except May, Nov., Dec.
1952—All issues, except Jan., Aug.
1953—All issues, except May, July, Dec.
1954—All issues, except Feb.
1955—All issues, except Nov.
1956—All issues, except April, July
1957—All issues, except Feb. and Nov.
1958—All issues, except July, Sept.
1959—All issues except Jan.

$1.00 per copy

All Issues of the Current Year, 50¢ Per Copy

CQ Magazine
300 West 43rd St., New York 36, N. Y.

GEM 6 METER CONVERTER

This is a semi-broadband converter & features high c/i ratios for peak interstage discrimination. 1st RF-triode & phase inmixer & oscillator 600K.C. I.F. 6/12V. assembled & tested.

variable osc. $20.50 xtal osc. $27.50

Gem Electronics
342 W. Grand Ave. Springfield, Ohio

G4ZU BEAMS AND ACCESSORIES

UNDER G4ZU PATS.

This DX beam is engineered for the low power man or the KW enthusiast who wants that extra something. Note; This improved beam eliminates the double boom and open wire feed. Now co-ax all the way. **NO TRAPS TO SET, NO COILS TO BURN OUT.** Factory preset for max. efficiency. Weighs only 16 lbs. Turning radius 13'6" ft. Longest element 23'3". Don't let a high loss low gain antenna rob you of DX. Go.G4ZU. Send check or money order for immediate shipment.

$79.50 Chicago

OBTAINABLE ONLY IN THE UNITED STATES AT

MASTER SERVICE

HOUSE OF ANTENNAS

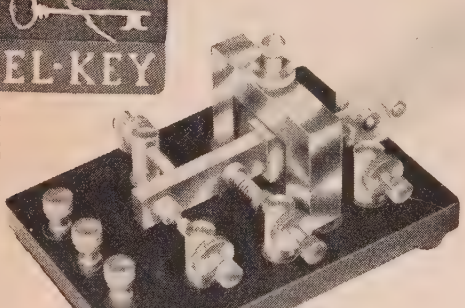
1153 East 82nd Street

Chicago 19, Illinois

For further information, check number 30 on page 126.

EL-KEY EL-KEY EL-KEY EL-KEY

EL-KEY



$15.50 P.P.-U.S.A.

Slightly Higher Elsewhere

ELKEY *is the answer to your* ELECTRONIC *keyer problems*—

- Mechanism and contacts completely insulated from base.
- Completely adjustable stops and spring tensions.
- Pure silver contact points.
- Heavy, clear lucite double paddles for beauty, durability and ease and comfort of operation.
- Rubber feet prevent skidding on *any* surface. Set it anywhere on the operating table—it stays where it's set.
- For the "lefty" as well as the "righty".

Poucel Electronics Co.

Div. of Shore Mfg. Corp.

Bob W2AYJ **P.O. Box 181** **Sid K2FC**

Babylon, L. I., N. Y.

EL-KEY EL-KEY EL-KEY EL-KEY EL-KEY EL-KEY

For further information, check number 31 on page 126.

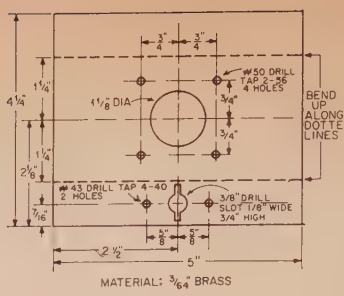


Fig. 16—Construction specs for piecel, output cavity-grid side.

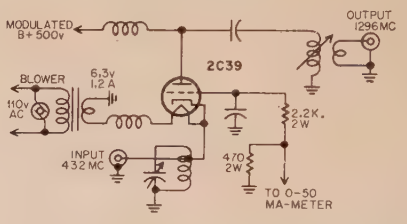


Fig. 17—Equivalent low frequency circuit.

The reader should refer to the 2C39 data sheet for the best operating values. The following conditions. which do not especially agree with the data sheet, were measured using an old somewhat tired 2C39A: drive frequency 432.75 Mc; driving power, measured with a Micromatch, 20 watts; grid resistor, 2.7K; grid current, 30 Ma; Plate voltage, 500; plate current, 90 Ma; output frequency, 1298.25 Mc power output, 18 watts. The output power was measured with two different Jones Micromatch units which had been calibrated at 1000 megacycles. The question arose, however, as to the possibility of some of the measured output power being 432 megacycle-feed-through. At this point, the output of the tripler was fed through a triple coaxial cavity filter, tuned to the output frequency. The 18 watts output power was still there! The reason for the apparently high efficiency is that a large percentage of the driving power is converted and shows up in the output *at the output frequency*. For this reason, in AM service, modulation should be applied to both the tripler *and* the driver. Usually, the modulated voltage for the tripler is stolen from the 432 Mc. rig anyway.

Using a pair of these triplers, a pair of 30' dishes, and a pair of converters with 7 *db* noise figure, several contacts have been made, the longest distance covered to date being about 85 miles. So far no longer hauls have been attempted. Future plans call for a parametric amplifier and a higher power transmitter possibly using one of the new RCA tetrodes in the 6816 series, following the 2C39A. Perhaps during the coming summer, the present slow increase of activity on the band will speed up, and some interesting contacts will be made.

The author wishes to thank Henry Cross, W1OOP, and Dick Williams, K2GRI, for their many helpful suggestions concerning the design and construction of the tripler, and Harley Radin, W1HUO, for the photographs of the completed unit. ■

Small Parts List

2 BNC Type /Coax jacks, UG 290/U
4 3-56 x 3/16"screws for mtg. BNC jacks
1 8-32 x 1" screw
1 8-32 Hex nut
1 8-32 Nylon Cap Nut
2 4-40 x ¼" screws
3 2-56 x 3/16" screws
3 ceramic shoulder washers (see text)
Short length of 3/16" wide copper ribbon (for input connection)
Preformed contact rings (see text)
Flat finger stock (see text)
Short length of shielded wire (center conductor must carry 1 amp.)
1 2.2K 2 watt resistor
1 470 ohm 2 watt resistor
1 Filament Transformer 6.3 v. @ 1.2 amp.

DX [*from page* 79]

VR1B—c/o WXT Department, Betio Tarawa, Gilbert Island;
VR2DO ex YJ1OM—Box 278, Suba, Fiji;
VS5AB—via RSGB;
VS5GS—Gordon Scott, Soas College, Brunei Town, State of Brunei, via Singapore;
VS6AZ—via K6GMA;
VS9MB—via K2QXG;
VU2RM—via W3KVQ;
ex ZM6AS—F. H. Fenton, ZL2ANB, 27 Blake St. Waitara, New Zealand
All 4X4's—c/o Nathan Gruenebaum, 4X4JH, P.O. Box 3213, Tel-Aviv, Israel;
3S7FJ—via W5GHK;
That's it for now. CU next month.

73 es DX Urb, W2DEC

NOVICE [*from page* 74]

VK3XB (Ivor) with his DX-20 and SX-16. He reminds us that Ivor is looking for Novices bout 5:00 AM EST, transmitting on 7150 and uning his frequency up to 7160.

Pete Bukowick, KN1KAJ, 62 Jefferson St., Westfield, Mass., has WAS 21/19, VE3 and KP4, on 80 and 40 with his Globe Chief, S-53, nd BC-348. Pete would like skeds with west-rn and south-western states.

Close to home is Melvyn Jeffcoat, WV6BUT, 781 H St., San Bernardino, Calif. Mel is an-ther Globe Chief 90 fan and uses it with his -38E. He has a WAS of 20 which were worked ll on one crystal frequency. Mel complains hat his 300 ohm twinlead dipole is only 20 ft. igh and has high-tension lines near it.

Gary Rancourt holds call K1JAM, and lives t 10 Ursula St., Waterville, Maine. He is 13 nd recently received his conditional. Gary ses a DX-35 with a S-40B and Q Multiplier. he antenna is an inverted "V" on 80 and a one element beam" on 15. He QSL's 100%, rill sked anyone, and needs skeds with six and even land.

Better Contacts over Longer Distance on the new 11 meter CITIZEN BAND

with **HELI-WHIP MOBILE ANTENNAS**

New Reduced Prices on Ham Band * HELI-WHIPS

Make the most of your 5-watt input on the 11 meter Citizen Band ...with a Mark HELI-WHIP. You actually get 2 to 3 times more radiated power over long base loaded whips. Good looking ... HELI-WHIPS are made of plastic coated Fibreglass — virtually indestructible. 10-11 and 15 meter models only 4 feet long. Available for all bands. Match 52 ohm coax. Very low v. s. w. r.

NEW HELI-WHIP DIPOLES for your fixed station

***3 band* HELI-WHIP *now only* $19.50**

Order from your parts jobber ... write for complete ham facts

* PATENT APPLIED FOR

MARK MOBILE, Inc.
5439 Fargo Avenue, Dept. C-99
Skokie, Illinois
***Phone:* ORchard 5-1500**

For further information, check number 32 on page 126.

GOOD BUYS
ALL ARE NEW UNLESS OTHERWISE INDICATED

TRANSFORMERS . . . All have 115 volt, 60 cycle primaries
Filament, 6.3 vct/0.6 amp; potted & HS ..... 1½# .79¢
Scope, 2500/3 and 2.5/1.75, oil filled & HS ..... 5# $1.95
Power, 500 vct/150 mils, 5/2 & 6.3/3, potted ..... 9# $3.39
Plate, compact, 600 vct/100 mils or 1200 vtc/50 mils 4# $1.95
Power, 300 vct/30 mils, 6.3/1 & 2.5/2.5, 1500 vRMS 5# $1.95
Filament, 6.3 v/6.1 amp, HS ..... 4# $1.89
Power, 600 vct/350 mils & 12.6 vct/11 amps ..... 18# $4.29
Power, 510 vct/25 mils, 12.6/0.9 & 6.3/0.5, potted 5# $2.19

CHOKES
10 hy/150 mils, 139 ohms, 1780vRMS, HS ..... 6# $1.89
6 hy/80 mils, 150 ohms, compact pot, Chi #7462 ..... 2# .95¢
3 hy/400 mils, 34 ohm, 1780 vRMS, case of 8 ..... 100# $10.95
20 hy/50 mils, 200 ohm, potted Kenyon #T-157 ..... 1# .79¢

CONDENSERS
10 mfd/100 dewv oil filled .. 3# .. $1.79 .... mntg hdwre 25¢
2 x 0.1 mfd/7000 dewv oil filled 3# ..... $1.09 .. mtg hdwre 25¢
0.25 mfd/5000 dewv oil filled .... 3# ..... 89¢ .. mtg hdwre .... 25¢
3x20 mfd/400 dewv octal plug-in electrolytic . 8 oz. ..... 2/95¢
30 mfd/450 dewv single single hole mount electrolytic . 8 oz. 3/95¢

CATHODE RAY TUBES
3AP1 $1.45 3BP1 $1.75 3FP7 $1.00 ppd 5FP7 $1.29 ppd
5JP1 .. $2.45 ppd 5JP2 .. $3.45 5FP11A $2.50 ppd (TV test)

MISCELLANEOUS VALUES . . . All are rare values in fine materials
Meter, 0-50 ua. Burlington model 921 ..... ±1 $4.95
Dynamotor, 6 volt input, 600 v/150 mils, Eicor ..... 10± $6.95
BC-610 tuning units ..... 4# $3.45 each . . . Complete set $24.95
Microphone, Navy CW-51094, hand held, noise cancelling, 100 ohm impedence, manufactured by Western Electric 2# $2.95
Attenuator 600/600 ohm T pad, Tech Lab, 30 step 1# 2/$4.95

VACUUM TUBES . . . Bargains by the dozen . . . cheaper by the hundred
2X2 .. $2.95/doz, 3B24 ..... $4.95/doz 6SL7GT $6.45/doz,
6SN7GT $5.45/doz 6V6GTC . $6.45/doz 6H6 . $2.95/doz
80Y .. $1.49/doz 7193 ..... $1.49/doz 6N7GT $6.95/doz

WRITE FOR FREE GOVERNMENT SURPLUS BARGAIN BULLETIN
Send adequate postage with orders We refund any overage
All prices are FOB Sacramento

JOE PALMER
PO BOX 6188 CCC, SACRAMENTO, CALIF.

For further information, check number 33 on page 126.

LOW COST RECEIVERS

NEED FRONT-END DRIVE!

Get a DOW BROADBAND BOOSTER!

Factory Warranty.

1¾" x 2", Less than 6 Ounces!

125 to 175 v B + @ 7 ma, 6.3 v heater, required.

DKC-RFB $10.75

Fully tested and proven. Essentially a 50 to 70 ohm impedance matching 'Broadband Pre-Amplifier', not a pre-selector! Designed specifically for medium-high to less sensitive receivers. Guaranteed to increase overall-gain by 1 to 6 'S' units, any receiver.* all bands 1.5 to 30 mc. Amazing results in MOBILE equipment using converters.

*Not intended to increase receiving quality of elaborate, expensive receivers; however, a gain of 2 or 3 'S' units should be noted.

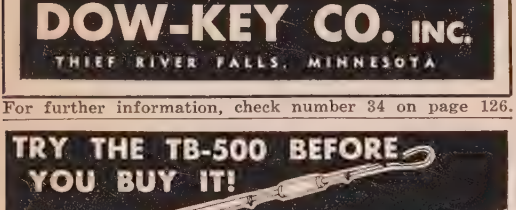
See your Electronic Dealer!

DOW-KEY CO. INC.

THIEF RIVER FALLS, MINNESOTA

For further information, check number 34 on page 126.

TRY THE TB-500 BEFORE YOU BUY IT!



THREE BANDS — 10 — 15 — 20 meters SINGLE 52 ohm coax transmission line. Weight 29 pounds. Turning radius 14' 11". Handles 500 W. (transmitter input, 100% am modulated.) ELEMENTS: 6061-T6 Aluminum tubing 1" tapering to ¾".

Cast aluminum fittings used throughout. PRETUNED and easy to install. Uses Hornets' exclusive weather-sealed trap design*.

The TB-600 with larger diameter boom and slightly heavier castings weighs 35 lbs. This is the heavy-duty model for greater wind and ice-loading conditions. Budget-terms $5.50 a month or $59.75 cash.

HORNET antennas are so easy to own—and so satisfying to use.

1 YEAR GUARANTEE

10 DAYS FREE TRIAL

WRITE FOR FREE ILLUSTRATED CATALOG

THE BEAM WITH A STING

HORNET Antenna Products Co

*Pat. pend. P.O. BOX 808 • DUNCAN, OKLA.

For further information, check number 35 on page 126.

Tommy Murphy, KN5UKH, Rt. #1, Kosciusko, Miss., closes the column this month. He is proud of the rig—a homebrew 50 watter. It must perform as his WAS is 27/27 and he has worked VK3 and WH6.

That's the bottom of the stack for another month, fellows. Keep the letters and pictures coming this way.

Seven Trees, DE Don, W6TNS

HAM CLINIC [*from page* 81]

(do this anyway). A small flashover will not blow the fuses but by gosh it will impair filtering action. I replaced my sockets and pulled out the unused pins from the new ceramic sockets (exact replacement).

Tape Recorder

"I've got some tape recorder problems; how about an assist? First, where is the best point in a transmitter to connect one? Second, how come I seem to get an 'echo' when recording from the transmitter? And third, is it feasible to connect the output of my recorder amplifier to the input of my transmitter's speech amplifier?"

Let's take the last first. You can use the same mike connected to your recorder to feed the SA in your transmitter, but I would not advise connecting the output of the recorder (usually about 5 or 8 watts) *directly* to the *SA* input. Rather, I'd tap off at one of the tubes ahead of the one feeding the loudspeaker and use a separate pot. "Echo" recording when transmitting means that some of the *rf* from the xmtr is getting back into the recorder (being rectified) and "pushed" through the recording head. A 2½ mh *rf* choke will usually stop this if it is interposed between the mike connector and the grid of the first *SA* tube. Power line "leakage" may be occurring too; this may take a brute force type of filter (two condensers .1 and up in capacity) in series across the line (center grounded). You may have to treat each SA separately. See the Handbooks on the latter. Switching a recorder between receiver and transmitter is relatively simple—DO use shielded connecting cables. I'd use a diode and a tuned circuit to pick up the *rf* and feed it into my recorder. I'd connect the recorder before a speech clipper in one of the first SA stages, otherwise.

DX 40 on SSB and Keying

"Can the DX 40 be used with the SB11 SSB Adaptor? Any changes published by *Heath* for better oscillator action?"

Yes on both counts. If you are an original DX 40 owner you more than likely will receive (or have received by now) a Special Modification Notice from *Heath*.

Erratic keying or no keying at all in the c

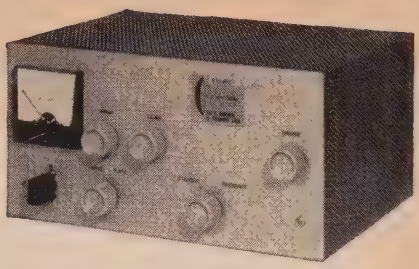
position (after tune up) may be remedied by carefully removing exactly 23 turns of wire from the 40 meter slug tuned coil. Begin at the red dot terminal which is the beginning of the outside winding. This makes the coil resonant on 20 meters. Tune the coil (with the slug) for grid current at the first peak. For better oscillator action insert a 47 ohm ½ watt resistor in series with pin #2 (grid) of the 6CL6 oscillator and pnt. #2 of the 12 position switch.

Adapting the DX 40 for use with the **SB10** is relatively easy with the instructions furnished by *Heath*. A separate power supply will be needed to power the **SB10.** When you order your **SB10** be sure to tell them that it *is* for the DX 40.

73, Chuck, 7F7E

SIDEBAND [*from page* 83]

OHØNC	240	87	20,880
ZS5JY	315	63	19,845
K9EAB	232	82	19,024
ON4DM	253	70	17,710
KØITF	231	76	17,556
DL4NP	276	57	15,732
KB6BL	340	45	15,300
K3BQB	193	78	15,054
K4QIJ	211	67	14,137
VE8NH	245	57	13,965
W6TOT	203	66	13,398
BV1US	166	69	11,454
WØFUH	164	64	10,496
K7GIE	144	67	9,648
K1KFP/VO1	153	63	9,639
KH6IJ	204	44	8,976
K4USK	222	40	8,880
K5PXU/5	200	43	8,600
SM5AQW	119	67	7,973
OQ5IE	132	59	7,906
TG9PS	249	31	7,719
VE2KW	123	62	7,626
ZL3AB	155	47	7,285
TF2WEG	124	56	6,944
W4IYC	86	78	6,708
W9PWZ	129	52	6,708
W2YHO	158	41	6,478
VE3ES	98	62	6,272
VE6EN	108	55	5,950
OH3NW	100	59	5,900
MP4BBW	105	56	5,880
W6FKZ	122	48	5,857
K4ZJF	127	43	5,461
VE3BJO	98	55	5,390
HB9J	95	53	5,035
W2QKJ	85	59	5,015
W2NXZ	100	44	4,400
K2JGG	90	48	4,320
W4EEU	116	34	3,944
W9ZKB	87	44	3,828
SVØWL	69	51	3,519
W2ZRX/VO1	79	42	3,360
DL1UX	87	38	3,306



432 MC. Xtal controlled transmitter

CENTIMEG

$184.50
Less power supply

1—Front Panel Tuning.
2—10 Watts or Greater Output.
3—Uses inexpensive FT 243 8 MC. Xtal.
4—Provision of Operating Antenna Change Relay.
5—2C39A Tube (in Silver Plated Cavity) in Final Stage.

ALSO AVAILABLE
144 MC., 220 MC., & 432 MC. CONVERTERS.
SEE YOUR LOCAL DEALER OR WRITE:
CENTIMEG ELECTRONICS INC.
312 E. Imperial Hwy. El Segundo, California

For further information, check number 36 on page 126.

CRYSTAL DEPOT

SPECIAL FREQUENCIES

ALL MARINE FREQ. SUPPLIED IN FT243—FT171—MC7 Holders. Also POLICE, C.A.P., C.D., MARS. tol. .005% — $2.00

.01% Tolerance	$1.50
.005% Tolerance	2.00
100KC Marker in HC6/U	4.00
1000KC in HC6/U	3.00
27.255 Radio Control	2.00

CITIZEN BAND CLASS D-3rd OVERTONE CRYSTALS 26.965 MC to 27.225 MC IN HC6/U HOLDERS $2.50 EA.

JET NOVICE CRYSTALS 99¢ (.01% Tolerance)
80 Meters 3701KC to 3749KC
40 Meters 7152KC to 7198KC
15 Meters 7034KC to 7082KC
6 Meters 8334KC to 8900KC

STOCK CRYSTALS 50¢
FT243 Holders 4035KC to 8650KC in steps of 25 KCs
DC34 Holders 1690KC to 4440KC
FT241 Lattice crystals 370KC to 540KC (except matched pairs + or — 15 cycles ... $2.00 pr.)
FT171 Holders 1738KC to 8616KC
CR1/AR Holders 6000KC to 8590 KC

SEND FOR FREE CATALOG

24 HOUR SERVICE

TERMS: Include 5¢ per crystal for postage & handling. No C.O.D.'s

JET CRYSTAL COMPANY

2416 AMSLER ST. near CRENSHAW BLVD.
TORRANCE, CALIFORNIA
PHONES: DAvenport 6-2300 & 6-2301

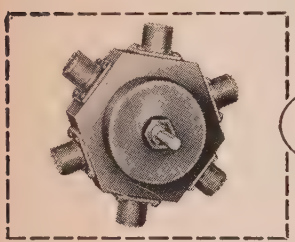
For further information, check number 37 on page 126.

SHIPSHAPE SHACK

No more screwing and unscrewing connections, no more dangling, sloppy leads when you have B&W multi-position coaxial switches.

Model 550A conveniently selects any one of five transmitters, antennas, exciters, receivers or other r-f equipment. Model 551A is a two-pole, two-position unit for switching equipment such as r-f power amplifiers in or out of a circuit. Both switches can be used with 52 or 75 ohm lines.

See these efficient, reasonably-priced switches at your B&W dealer, or write us for information.



550A—PRICE $8.25

551A—PRICE $7.95

Barker & Williamson, Inc.

Canal Street & Beaver Dam Road

Bristol, Pennsylvania

For further information, check number 38 on page 126.

YOUR mailing strip is IMPORTANT

3.SO 7M 3593R c JAN 59

J W CUMMINGS-W6SFI
752 PICO AVE
SAN MATEO CALIF

This is a typical mailing strip

Whenever you write to CQ concerning your subscription, change of address, or renewal, cut your mailing strip from the wrapper of your latest copy and attach it to your letter.

This will help us to find your stencil in our files which is the first step in faster, more accurate service to our readers.

CQ Magazine

300 West 43 St., New York 36, N. Y.

XEØNHD	152	21	3,192
DL4ML	176	18	3,168
G2CWL	121	23	2,783
W2FGZ	67	38	2,526

Martin, VE3MR is still awaiting some fancy pictured QSL cards from the printer for his dx/pedition activities at PZ1MR, FY7YF, VP3RO and PJ5AC. He made 322 contacts from these QTHs plus 2300 from TI9SB. Not bad for SSB! QSLs for SSB contacts with any of these four stations go to VE3MR, P. O. Box 508, "Station F." Toronto 5. Ontario, Canada.

The XE4B dx/pedition to Socorro Island is finally accomplished and I hope you were all lucky enough to make contact. Despite other reports, I thought XE4B had a fine signal, and his method of giving times in GMT of each QSO was excellent for future log checking. Too many of us fail to show proper dates and times of our QSOs and it is a terrific task for a DX station to find the particular contact, claimed in a log with hundreds of entries.

One of the best operated dx/peditions was that of Juan, EA2CA from Ifni, as EA9DE and from Andorra as PX1DE. Juan who is an experienced DX operator and well used to SSB techniques, certainly handled things masterfully. Pile-ups were terrific, but Juan patiently asked for courtesy at times when necessary and acknowledged most every one who called him. PX1DE, EA9DE, XE4B made it 177 countries for W3SW. By the way I was lucky to have gotten PX1DE on the first call. I wasn't so lucky with EA9DE, but then I heard some stations calling Juan for three days. Hi. Is it luck or what? One thing is sure and that is that it takes lots of time and patience and skill to contact all of these elusive dx/peditions. And plenty of lung power.

George, OK1HZ has left Albania and if he can obtain a license will soon be heard from Turkey and Greece. Hope he listens more in the W/K portion of twenty, than he did from OK1HZ/ZA.

My stock of photos of operators and stations is exhausted and it will be appreciated if you will forward yours or another Sidebanders.

73. Bob,W3SW

SCRATCHI [*from page* 16]

ing it up for battery operation, then rigging it in wooden box, battery, antenna and all, then fixing lock for box.

This are planning ahed. If ten-yeer old fellows reel smart, they cutting down antenna, or disconnecking battery leeds, or turning off rig or something. By putting in hevvy wooden box and locking it, not having any trubble on that score.

Also making up ten reseevers plus some spares. Getting tiny cast-iron boxes about size matchbox, putting in cupple transisters and

60 WATTS ON 6 METERS

THE NEIL *BETA 6* SIX METER PHONE TRANSMITTER

- Two Tuning Meters Eliminate Bothersome Meter Switching
- Exceptionally Clean Modulation
- Ideal for Mobile or Fixed Station - only 3 inches high
  B+ requires 600v @ 100ma; 350v @ 200ma (approx.)

20 WATTS ON 6 METERS

THE NEIL *ALPHA 6* SIX METER PHONE TRANSMITTER

ALL ABOVE FEATURES PLUS BUILT-IN 3-POSITION CRYSTAL SWITCH

B+ requires 300v @ 200ma (approx.). Specify 6 or 12v filament.

BUILT-IN TRANSISTOR POWER SUPPLY

THE NEIL *MOBILEER* SIX METER PHONE TRANSMITTER

STRICTLY FOR MOBILE 12v OPERATION • **No External B+ Supply Needed**

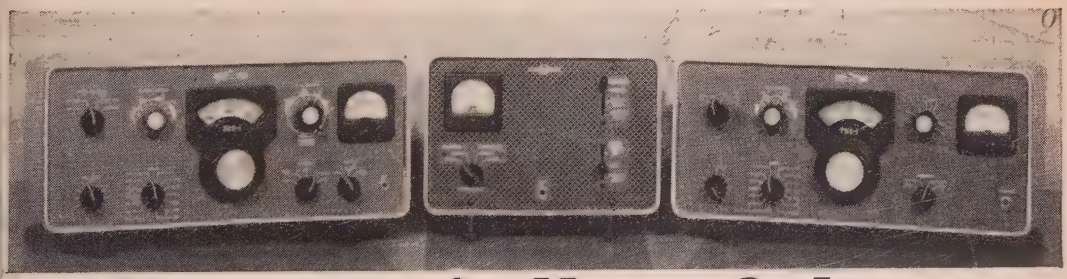
All features of the Alpha 6, 20 watt transmitter, but requires 12v DC *only*.

Beta 6, wired, complete with tubes and crystal $125.00	Alpha 6, kit, complete with tubes, crystal, construction book $58.50	Neil Mobileer $159.00
Beta 6, kit, complete with tubes, crystal and construction book $98.00	Fixed power supply, Alpha 6 .. $39.50	Neil Mobileer, kit $134.00
Alpha 6, wired, complete with tubes and crystal $78.50	As above, kit $32.00	***All transmitters available for 6 or 10 meters and 6 or 12v filament.***
	Fixed power supply, Beta 6 .... $79.00	***• Please Specify •***
	As above, kit $68.00	

See Your Dealer or Order From: **THE NEIL CO. • 1336 Calkins Road • ROCHESTER 23, NEW YORK**

For further information, check number 40 on page 126.

KEN-ELS RADIO SUPPLY FOR THE FINEST



it's here The new Collins S Line

WRITE • PHONE • WIRE

FOR A TOP TRADE

32S-1 Transmitter ..	$590 00
75S-1 Receiver	$495.00
312B-4 Speaker Console	$185.00
312B-3 Speaker	$ 27.50
30S-1 Linear Amplifier....	$1470.00

WØZCN—Ken—Fort Dodge

428 Central Ave., Fort Dodge, Iowa
Phone: 3-8801

KØABO—Rog Cedar Rapids

67 16th Ave., S. W., Cedar Rapids, Iowa
Phone: EM 4-1172

For further information, check number 50 on page 126.

SX-100 $195., SX-101 $255., NC-300 $245., NC-183D spkr, $249., HRO-50T1 $249., HRO-60 6 coils $395., NC-66 $89., SP-600 $395., 75A-1 $249., 75A-4 $595., 51J-3 $575., KWS-1 $1095., BC-794B 1.2-40MC $159., HQ-160 $295., HT-32A $595., RAK-7 $65., BC-312 $49. Teletype converter, printers, reperforatory, etc. Write

Tom W1AFN, Altronics-Howard Co.
Box 19, Boston 1, Mass. Richmond 2-0048

Used gear at big savings! Send for free list. Samples of our lower prices: Viking II, $149.95. NC-98 $99.95. Globe 680-A $99.95. We stock new as well as used gear. Try the Hi-Par coaxial antenna for ten meters or Citizen's Band at only $14.95. We stock Hy-Gain and Mosley beams, Antenna Specialists ground plane and mobile antennas. Write for prices. We buy ham gear for CASH.

H & H ELECTRONIC SUPPLY, INC.
506-510 Kishwaukee St. • Rockford, Ill.
H & H — Ham Headquarters

Bargains: Reconditioned and guaranteed. Shipped on approval. Easy terms available financed by us. Hallicrafters S38 $29.00, S85 $89.00, SX99 $119.00, SX96 $159.00, S40B, SX71, SX100, SX101, HT32; RME HF-10-20 $49.00, VHF152A $49.00, RME 4350 $159.00; National SW54 $29.00, NC98 $99.00, NC183D $249.00, NC300 $279.00, HRO's; GPR-90 $349.00; Johnson Pacemaker $295.00, Viking II, Ranger, Valiant, Thunderbolt; Heath DX35, DX100; Hammarlund HQ100, HQ110, HQ129, HQ140, HQ150, HQ160, HQ170; Collins 75A1, 75A2, 75A3, 75A4, 32V1, 32V2, 32V3, KWS1, KWM1; Central 10B, 20A; Globe; Gonset; much other equipment. Write for list.

HENRY RADIO, BUTLER, MO.

BARGAINS: Reconditioned and fully guaranteed. HQ-100 $139.00; HQ-129X $158.95; HT-33 new Demo. $550.00; Heath Q Multiplier $8.49; NC-300 $279.00; KWM-1, 75A-1, 75A2, NC-183D $289.00; Globe Chief 90 $44.00; Super PRO $94.50; Globe Scout 680 $89.95; HT-18 $39.95; RME-84 $59.95; Lysco 600 $59.50; Knight 50 Watt $29.50; National SW-54 $34.95; AF 67 $139.00; PMR 6A $79.95; Harvey Wells T-90 $128.95; Globe King 275 $179.00; Central Electronics 20A $189.00; Side Band Slicers $59.00; Heath AT-1 $22.95; Hallicrafters S-53 $49.00; KWS-1, Morrow MBR-5 $159.00; MBS 60A $159.50; DX-20 $29.95; NC-173 $129.95; NC-125 $139.50; NC-88 $89.95; 32V3 $450.00; 32V2 $349.00; Globe King 500A $425.00; HQ-140XA $189.50; NC-109 $179.95. Write

KEN-ELS RADIO SUPPLY
428 Central Ave., Fort Dodge, Iowa or
128-31 Street, Cedar Rapids, Iowa

tiny speeker, battery, then soldering hole thing shut. Reel slicky, you not thinking? No ten ten-yeer olds getting ahed of Hashafisti Scratchi. Even soddering clip on box so can clipping hole thing on shirt or almost anyplace.

Next morning Hon. Cheef Woodmaster driving me to camp up in mountains. Are 1/*c* place, with swimming pool, log cabins, tennis courts, everything anybuddy could desiring. Spending the day fixing up everything shipshape, and then explaneing to little fellers how we going to doing things. Are also telling them that must always having reseever with them, or they getting twenny demerits, which meening no candy, or bubble-gum for to weeks.

So, brite and erly next morning—but Hon. Ed., I not feeling like going thru all that. Why not insted letting me telling you the notes I taking after being there for one day. Okey? Okey.

1. Re-designing reseever so not having speeker grill—to easy to filling with mud so no awdio comes out. 2. Making speeker grill waterproof so can't wearing while swimming and drowning hole reseever. 3. Welding, not soddering cast-iron case shut, so when putting reseever neer camp-fire, it not coming apart.

4. Yewsing stainless-steel case, not cast-iron case, for reseever, so when twenny pound rock dropped on it, it not braking wide open. 5. Yewsing shock-proof transisters, so reseever not being hurt when being yewsed as baseball.

6. Designing reseever to having at lees twenny watts awdio so can heering even when little fellers talking in normal shout. 7. Puttin transmitter mike inside wooden case so it can't be cut ofi and lost. 8. Putting transmitter in wooden case so hevvy that ten ten-yeer old can't lifting, otherwise finding wooden case at bottom of swimming pool.

Hon. Ed., at this point I not taking any more notes. One of the WARTS borrowing my pencil. All I can saying now is that good old U.S.A. tecknology may be good enough to put reseever in Hon. Saddelite but not yet good enough to making one for ten-yeer old boy.

Respectively yours,
Hashafisti Scratchi

Gather Multipliers in the next VHF-DX Contest with MA-H VARACTOR DIODES

REMARKABLE INCREASE IN YOUR RECEIVER SENSITIVITY — FROM 4 to 10 db WILL HELP YOU TO

ADD A STATE
MAKE 48
(plus Alaska & Hawaii)

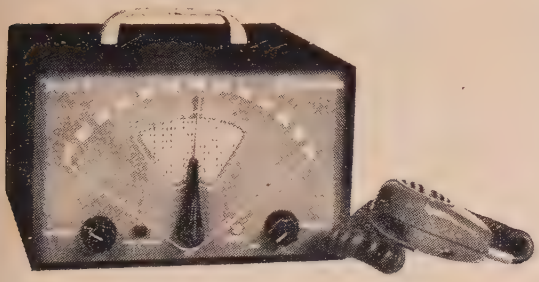
Your parametric amplifier and MA-H Varactors will do for your station what they're now doing for military communications.
They're available to ham operators only — for $10 via money-order or check WITH YOUR STATION CALL. (Instructions supplied with each Varactor).

MICROWAVE ASSOCIATES, INC.
BURLINGTON MASS. • Telephone BRowning 2-3000

For further information, check number 41 on page 126.

The "DUAL D" by LAKESHORE

* Receive on Fixed Frequency Crystal Controlled Receiving Channel — or —



* Receive on any of 23 Channels with variable Frequency receiver.
* Transmit on either of 2 preselected Channels. Covers all Channels with proper Crystals.
* Push to talk operation with Control button on Microphone
* Squelch Control Mutes receiver for Stand-by operation
* Automatic noise Limiter
* Power input 5 watts AM Modulated
* 11 tubes for top Performance
* Meets all F. C. C. Requirements
* No license Exam required — Any Citizen 18 years or older may obtain license by submitting Form 505 to F. C. C.
* May be used for Personal or Business purposes.

CLASS "D" CITIZENS BAND
TWO-WAY RADIO

FOR PRICE AND MORE DETAILS WRITE TO
LAKESHORE INDUSTRIES

Lakeshore INDUSTRIES
MANITOWOC, WISCONSIN
MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

For further information, check number 42 on page 126.

Magazine Subscribing for Fun and Profit

This is a respected old hobby which has been revived in recent years. Newer devotees of the hobby report a strong tendency toward addiction, however this may be somewhat exaggerated by them in an attempt to build up their egos as daring adventurers in a new field. One of the main deterrents to entering this fascinating hobby is the inertia of fixed habit patterns. Many people scale our highest mountains with less effort than others find it takes to fill out a subscription blank, make out a check, address an envelope, stamp it, and get it in the mail.

Just as sort of a test of your natural aptitude along this line, to see if you might take to this hobby, try our little test. Fill out the form, a check, and mail it in to us so we can judge it. Neatness and speed both count.

C9

CQ Magazine
300 West 43rd St.
New York 36, N.Y.

One year, $5 **Two years, $9** **Three years, $13**
in U.S. Possessions, APO & FPO, Canada & Mexico

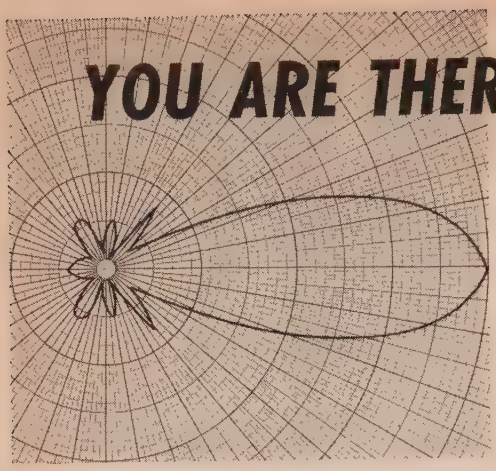
Enclosed is $.....for a.....year ☐ new ☐ renewal subscription to *CQ*, to be sent to:

Name..... Call.....

Address .....

City..... Zone..... State.....

Pan-America and all other foreign: 1 yr. $6; 2 yrs. $11; 3 yrs. $16.



YOU ARE THERE! with telrex

"TRI-BAND" SYSTEMS

There's long term dependability, scienti leadership, world-wide respected perfor ance plus quality of material too, at a pr even the modest budget can afford.

Enjoy superior performance . . .

You're always a "step ahead" with Telrex. Arrays from $5.95 to $12,000. Also available Rotators, "Baluns", Towers. Dollar-for-dollar better in every way. Send for technical bulletins, today!

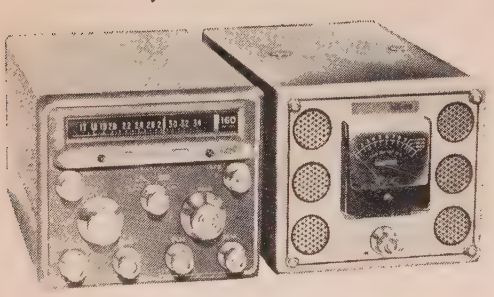
ANTENNAS SINCE 1921 **telrex** Communication and TV Anten LABORATORI

ASBURY PARK 25, NEW JERSEY, U.S

For further information, check number 43 on page 126.

FEATURE by FEATURE *compare!...*

THE AMAZING KE-93



The KE-93 is a precision 12-tube dual-conversion superhet receiver for fixed or mobile use, covering 10 thru 160 meters, plus broadcast band. A miracle of engineering, the KE-93 has features usually found only in large tabletop receivers.

Unusual electrical and mechanical stability
Rugged die-cast construction
Exclusive revolving turret tuner with revolving drum dial
AGC and BFO for receiving AM, CW and SSB
Calibrate position for transmitter VFO spotting
Separate AC and 6-12 volt power supplies

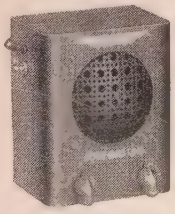
Write today for the complete story . . . technical data, schematics, etc.

AE

AUTOMATION ELECTRONICS, IN

1500 WEST VERDUGO AVENUE • BURBANK, CALIFOR

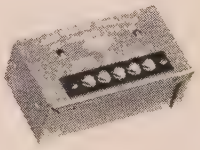
For further information, check number 44 on page 126.



BUD PRODUCTS with Extra Features

CODE PRACTICE OSCILLATOR AND MONITOR CPO-128A Amateur Net $19.13

THE ONLY OSCILLATOR WITH BUILT-IN MONITOR WHERE NO MODIFICATION IS NEEDED TO CHANGE FROM OSCILLATOR TO MONITOR AND BACK AGAIN. It has 2 tubes and a built-in 4" dynamic speaker. Operates on 110V. AC or DC. Also available in earphone model CPO-130A at $16.50.



CODE PRACTICE OSCILLATOR AND MONITOR CPO-155T Amateur Net $5.88

THE LOWEST PRICE COM PLETELY TRANSISTORIZE COMBINATION C.P.O. AN MONITOR ON THE MAR KET. It's small, yet rugge Works indoors and outdoor Performance compares fav orably with higher price earphone model.

See these and other Bud Products at your nearest Bud Distributor.

BUD RADIO, INC. 2118 East 55th Street Dept. C., Cleveland 3, Ohio

BUD THE MARK OF PERFECTION

For further information, check number 45 on page 126.

ONTEST CAL. [*from page* 85]

WW DX

Last month's CQ carried the rules in full. ential they are the same as last year with odification in the multi-operator division. Copies of the rules have been distributed to the known amateur radio organizations in world. However a mention of the dates to se rare spots you work will do no harm. Don't forget to get your request for log ets in early. And include a large addressed, mped envelope please.

ARRL SS

We don't have the space to tell you about one. Anyway, the boys at Hartford can a much better job I'm sure. So there is hing you can do but refer to "that other gazine."

There's plenty of contest activity ahead, uld satisfy even the most rabid contest fan, o to it gang. Those lush condx we have had past two years are now on the down le. Have fun.

73, Frank, W1WY

OLATIONS [*from page* 48]

teur stations as of June 30, 1958, rep- nts, therefore, an increase of approxi- ely 18% only over the number of licensed teur stations as of June 30, 1956. This ease in amateur licenses does not appear ear any recognizable correlation with the endous increase in amateur citations ring the same period of time.

o attempt is made in this report to analyze causes of the sharp increase in amateur tions. The startling increase in reported tions may well justify a careful and sober nation of its causes by responsible eurs and amateur groups. The statistics nateur violations are well known to those covet amateur frequencies. It can serve potent weapon in the hands of the gonists of amateur radio. The trend is ning and dangerous and the effectiveness mateur radio's traditional self-policing ram may soon be embarrassingly chal- d.

word to the wise should be sufficient heeded. ■

THE BEGINNING [*from page* 44]

and return, amateurs gradually diminished me-cycle until in 1921 they accomplished eat in six minutes.

TWO-WAY COMMUNICATION CRYSTALS

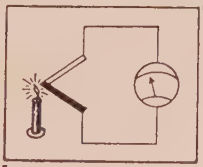
UNCONDITIONAL
3 YEAR GUARANTEED
FAST — 24 HOUR SERVICE

American specializes in two-way communications. Frequency correlation data for G.E., Motorola, R.C.A., Collins, Lear, Narco Hallicrafter, Link and Gonset, Aerotron and many other companies.

FREQUENCY RANGE	CALIBRATION TOLERANCE	PRICE
1000 KC to 2000 KC	.002%	$6.50
2001 KC to 2500 KC	.002%	$4.00
2501 KC to 9999 KC	.002%	$3.00
10 MC to 15 MC	.002%	$4.00
15 MC to 30 MC	.0025%	$3.00
30 MC to 50 MC	.0025%	$4.00
50 MC to 60 MC	.0025%	$6.00

Write for quantity discounts—

AMERICAN CRYSTAL CO.
821 E. 5th St. Kansas City 6, Mo.



THERMO ELECTRONICS
SUCCESSOR TO
THERMO-ELECTRICITY

Change heat to electricity DIRECTLY — no acids, liquids, chemicals, moving parts or sunlight! Build or buy a THERMO ELECTRONIC BATTERY. Write today for free literature.

HERMON E. COTTER
Dept 23, 15766 Blackstone
Detroit 23, Mich.

FOR THE FINEST IN AMATEUR PHONE PATCHES ITS . . .

KWICKPATCH

The high speed high quality patch
AM Models $14.95. Dual by-brid Sideband models $24.95. No switching . . . No disconnecting . . . Models for single or double connector microphones. See them at your distributor. For literature write to
KWickPatch, P. O. Box 612, Redwood City, California

"HOW TO MAKE MONEY IN Mobile Radio Maintenance"

AUTHORITATIVE GUIDEBOOK
ABOUT THE BOOM IN TWO-WAY MOBILE-RADIO: GIVES FACTS, FIGURES, PAY RATES.
WRITE TODAY!
FREE
LAMPKIN LABORATORIES, INC. Electronic Div. BRADENTON, FLA.

VAN SICKLE Radio Supply Co.
BEST PLACE TO BUY HAM GEAR!
New and used bargains, big trades
4131 N. Keystone Ave., Indianapolis 5, Ind.

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an **Instructograph Code Teacher.** Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

ENDORSED BY THOUSANDS!

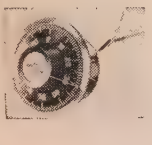
The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with **the Instructograph System.** Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

4711 SHERIDAN RD., CHICAGO 40, ILL.

357 West Manchester Ave., Los Angeles 3, Calif.

INTRODUCING . . . ELECTRO DIAL



The First "Combination-Operated" Electrical Switch for

HAM STATIONS • HOME WORKSHOPS

- Allows power to your equipment only when the proper three number combination is dialed
- Rated at 1Amp/115VAC—Use control relay for higher current applications
- Easily installed—Guaranteed performance

Manufactured by Electro Dial Inc.
7039 Sunset, Hollywood 28, Calif.

$14.95 net

Distributed exclusively by General Cement Mfg. Co. and G. C.'s 2000 electronic parts distributors.

CITIZENS TRANSCEIVER

TWO MODEL DELUXE AND STANDARD

The Standard Model is complete with microphone, with tubes and crystals for one channel, and power cord. Specify operating input power. **SCBT-1** $114.50

The Deluxe Model is complete with Push-To-Talk and Noise Limiter, with tubes and crystals for one channel, microphone and power cord. **DCBT-1** $124.50

Specify 6 Volt DC—12 Volt DC—or 110 Volt AC with either model. Size description: 3¼" in height, 8" in depth, 9⅞" in length. Color: Durable platinum grey wrinkle finish.

Tube Lineup: 6BA6-RF, 6U8 Mix-osc, 6BA6 I.F., 6T8 Det, Noise Limiter, and audio preamp, 6AW8 1st audio and squelch, 6AQ5 audio output and mod., 6AU8 RF Osc and RF Amplifier.

Fixed Station Antenna $29.95

Mobile Antenna with bumper mount $19.95

DUNLAP ELECTRONICS INC.

764 NINTH STREET — DES MOINES, IOWA

Groth TURN COUNT DIAL

Registers Fractions to 99.9 Turns

FOR roller inductances, INDUCTUNERS, fine tuning gear reducers, vacuum and other multiturn variable condensers. One hole mounting. Handy logging space. Case: 2" x 4". Shaft: ¼" x 3". TC 2 has 2⅛" dial—1⅝" knob. TC 3 has 3" dial—2⅝ knob. Black bakelite.

TC 2 $4.20—TC 3 $4.75—Spinner Handle 75¢ extra

Add 8¢ for Parcel Post

R. W. GROTH MFG. CO.

10009 Franklin Ave. Franklin Pk., Illinois

Violations

Here and there sporadic cases of growi pains emerged. In 1914 a Los Angeles amate operated his station without a license and caus commercial interference. This was the first v lation in the district since the Licensing la Though the penalty allowed confiscation equipment and a $500.00 fine, the judge voked a nominal fine accompanied by a wa ing.

The East Coast had its dead beats too. New York operator parted with $50.00 for op ating radio telephone without a license. An Bronx, New York operator flirted with regulations by operating higher than 200 met without a license and causing commercial int ference. In addition, he used false call lett He too, found the ordeal expensive.

High-Speed Keys

As better rigs put out improved signals, m amateurs found the ordinary sending key slow and awkward for their sending ability. T need caused semi-automatic vibrating keys appear in their shacks.

Though providing a rest cure for the t wrists of high-speed hams, these keys had distinct disadvantage of being expensive. Bef long, however, this detrimental feature of high-speed keys succumbed to amateur ing uity. Also, in 1914, a leading electrical per ical carried a thorough article showing c structional details and dimensions for a d yourself vibrating key.

YL Activity

About the beginning of 1915, a new si cracked the atmosphere of New England. I its cousins buzzing about the ether, this si also came from a homebrew rig. Its tone no better or worse than the others, but a da ness characterized the sending.

What a surprise hit the amateur frate when they discovered the operator was Cecil Powell, secretary to the ARRL cofoun Hiram Percy Maxim. Under his guidance built her own equipment and mastered the c If not the earliest YL, she was certainly on the earliest.

Vacuum Tubes

As 1916 approached, both amateurs professionals obtained remarkable results oscillating audions. Some amateurs snared nals over three and four thousand miles a Before use of these "little glowing giants," signals passed by unnoticed. Now a new r of receiving opened up. With no change i or power, amateur stations suddenly found signals reached several times as far as

thought possible. And the reason: audion detectors were fifty percent more sensitive than crystal detectors.

Addition by deForest of a grid to Fleming's vacuum valve tremendously increased its sensitivity and produced this wonderful radio detector. Originally, only deForest made them; later others too produced them. Soon amateurs increased their performance by using these tubes in regenerative circuits. Later, they made the tubes perform as amplifiers.

Early tubes were fussy. Some were extremely sensitive and others very insensitive. Some required high plate voltage while others couldn't stand it. Filament brilliance and plate potential required critical adjustment. Some showed a blue glow and wouldn't operate as detectors. Before long they earned the terms "hard" tubes and "soft" tubes. Eventually, research work created uniformly sensitive and reliable tubes. They operated with a plate potential of 22½ volts, and filament brilliance no longer affected performance.

[To be continued]

RANGER [*from page* 41]

screw driver adjustment type.

A VR-75 tube is to be placed on the external power supply section of the SB-10. This VR tube is wired plate to ground and the ground side is keyed by the bias control relay terminals in the SB-10. The VR tube drops the bias voltage to the 5000 ohm pot to 75 volts. The middle connection of the 5000 ohm pot is wired to the *rfc* L7; R37 is disconnected. This gives us the required grid bias and a means of adjustment. A wire is run from the 115 volt side of the pot to the remaining external connector. This completes the wiring to place the 6146 in linear operating condition. For initial operating and testing all modulator section and clamp tubes are removed.

Step No. 5: The SB-10 requires a power supply of 300-350 *vdc* at 85 *ma* and 6.3 *vac* at 3.5A. This is readily constructed from information in the power supply section of the Handbook. The only addition is the VR-75 tube for keying the bias of the 6146. The external grid control lead from the Ranger is brought to the cathode of the VR-75. The plate is then run with the power cable to pin #5 of the SB-10 power plug. When the SB-10 is keyed the VR-75 conducts and the bias voltage is in operating range. When the relay contact is broken, the VR-75 is switched out and the bias voltage soars which cuts off the 6146. The bias voltage is adjusted with the 5000 ohm pot to give a resting final plate current of 22 *ma* when the SB-10 is keyed. The final is loaded to 120-125 *ma* instead of the 250 *ma* described in the SB-10 manual. The final grid meter is now inoperative, but operation is restored when switching circuitry is installed.

[*Continued on page 120*]

TELEWRITER CONVERTER

FOR RECEIVING

RADIO TELETYPE

A complete station for receiving amateur or commercial radio teletyped messages requires only the following equipment: 1. Communications radio receiver. 2. Telewriter Converter. 3. Teletype Printer.

The Telewriter Converter is connected to the audio output of the receiver and converts the teletype coded CW signals into d.c. pulses to operate a selector magnet in the Teletype Printer. We supply all of the equipment for receiving and transmitting by radio teletype. For details and prices, write Tom, W1AFN.

ALLTRONICS—HOWARD CO.

Box 19, Boston 1, Mass. *Tel. Richmond 2-0048*

NEW HIGH POWER PULSED OSCILLATOR PG-650-C

The successful introduction of the PG-650 pulsed oscillator to many test applications has led to an improved model of interest to workers in ultrasonics, r.f. transient analysis, nuclear magnetic resonance, etc. Please write for our bulletins on other test equipment: Wide Band Amplifiers, Preamplifiers, and Precision Attenuators.

ARENBERG ULTRASONIC LABORATORY, INC.

94 Green Street, Jamaica Plain 30, Mass.

Phone—JAmaica 2-8640

2, 6, 10 — Meter

MOBILE EQUIPMENT

MOTOROLA, R.C.A., G.E., LINK, etc. 30-50 Mc., 152-172 Mc. Used Commercial F.M. Communications Equipment Bought & Sold. Complete two-way sets meeting F.C.C. Licensing Requirements for taxicabs, Police, Fire, etc. **$169.00** and up.

Motorola F.M. Receivers, Double Conversion ..... **$55.00** each

Motorola F.M. Transmitters..... **45.00** each

COMMUNICATIONS ASSOCIATES INC.

165 Norfolk Street

Dorchester, Mass.

CITIZEN BAND CRYSTALS

All frequencies for
Channels 1 to 22 inc. for Class D + or — .005%
Quadruple, Triple, Double or Straight in.
UNCONDITIONAL GUARANTEE
FAST 24 HOUR SERVICE
SPECIAL $2.50 EACH WITH THIS AD
HC6/U or FT 243, Pins Optional, Hermetic Seals.
Write for quantity discounts
AMERICAN CRYSTAL CO.
821 East 5th St. Kansas City 6, Mo.

HAM LICENSE COURSES

Resident Classes—3 Evenings a Week. Thorough preparation in Code and Theory. Qualifies for NOVICE CLASS in 4 Weeks and for General Class in 2 Months.

Dept. C, DELEHANTY INSTITUTE

117 East 11 St., N.Y. 3—Phone GR 3-6900

FALL SALE ON NEW ITEMS

Special—Following items have been taken in on trade and are all in excellent, very clean, good-working condition: One of a kind.

- Collins 32V2 Xmtr $265.00
- NC-300 Receiver $250.00
- B & W 5100 Xmtr $250.00

- **Aerovox** type 1960-204 Mica Capacitor. .00015 MFD 12500 peak volts. 6 Amps 300KC 3.9A 1000KC. 1.6A 300KC **$5.95**
- **Silicon Rectifier** input 130 volts @ 500 MA. 75¢ each, 10 for **$7.00**
- **DPDT 12 VDC Relay** (MF'D for Collins). Ideal for mobile applications, etc. Coil resistance 40 OHMS. 1½" x 2¾" x 1¾". Has an additional separate SPST contact (normally open), useful for receiver muting, etc. New original boxed. Order Cat. No. R22 very special ..... **$1.25 each**
- **Allied Catalog No. BOH-XP-3.** 2 relays-herm. sealed can. Each relay DPDT. 115 V.D.C. coil-res. 2900Ω—contacts-5 AMPS-115 V.A.C.—4 normally closed—4 normally open. Price **$2.00 each**
- **SSB Versatile Miniature Transformer** same as used in W2EWL SSB RIG—March '56 QST. 3 sets of C.T. Windings for a combination of impedances: 600 OHMS, 5200 OHMS, 22000 OHMS. (By using the center-taps the impedances are quartered.) The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, phone patch, line to grid or plate, impedance choke, etc. Size only 2" H x ¾" W. x ¾" O. Brand new—fully shielded in original cartons. Weight: 2½ ounces. 95¢ each; 3 for **$2.50**; 10 for **$7.50**
- **Brand New T-17 Microphone.** The famous T-17 Microphone usually in limited supply, is now available at an excellent price, due to a special purchase. These units are unused, and come complete with 5 ft. cord & PL 68 plug. They have hang-up hooks and push-to-talk switch. New-original packed. Special **$4.95**
- **'Scope Cathode-Ray Tube Shields** 3 inch type with bezel. New **$3.00**
- **RCA RS-151B HI-FI Amplifier** monaural, or auxiliary amplifier stereo 2-6CG7, 2-6V6GT, 1-5Y36T. Brand new packed in original RCA cartons with instruction sheet. **$19.95** less tubes. Tubes **$3.80** extra
- **2 Mfd. @ 4,000 Volt, D.C. Capacitor.** New **$5.00**
- **Antenna Mounting Bracket brand new.** Upper portion 4½" H. Standard 5/16" thread. Strong heavy-duty spiral spring. In original carton. Weight: 2 lbs. Price **$1.95 each.**
- **.75 KVA Hi-Voltage Xmfr**—Ideal for Hi-Potting. PRI.: —115 Volts A.C. 60 cycles. SEC.:—20,000 VCT @ 30 MA. (Approx.) NET WEIGHT:— 67 lbs. New. **$15.00**
- **Model I-177-A Dynamic Mutual Conductance Tube Tester**—Very good and Clean—Lab Certified O.K. Condition. Wt. 16½ lbs. **$24.95**
- **M3 Sniperscope w/20 KV Pwr Supply.** Lab tested. Finest unit available today **$120.00**
- **IN STOCK:** NC-60, G-50, HQ-100, HQ-160, HQ-145-C, Drake 1-A, & others. Write!

All prices F.O.B. N.Y.C. Specify method of shipment. All merchandise insured and guaranteed for cost of mdse. only. Receiving tubes guaranteed 90 days—Special purpose & Xmtg. tubes guaranteed 30 days.

Write for New Green Sheet Supplement Catalog

BARRY ELECTRONICS CORP.

512 Broadway, Dept. C9 N. Y. 12, N. Y.

Telephone: WAlker 5-7000

The Ham Shop

RATES: 25¢ per word per insertion for commercial business organizations.
10¢ per word per insertion for individuals on a non-commercial basis. *Full payment must accompany order.*

MINIMUM CHARGE $1.00

CLOSING DATE: 20th of the 2nd month preceding date of issue.
MAIL: Your typewritten copy with full remittance should be sent to CQ Magazine, 300 West 43rd St., New York 36, N. Y.
Attention: Classified Ad Dept.
NOTE: The products and services advertised in this section are not guaranteed by the publisher of CQ. Telephone orders not accepted.

FOR SALE

80-40-20-15-10-Antenna. $21.95. Patented. Write W4JRW, Lattin Radio Laboratories, Owensboro, Kentucky.

ATTENTION MOBILEERS!! Leece Neville 6 volt 100 amp. system alternator, regulator, and rectifier, $45.00. Also Leece Neville 50 amp. system, $50.00, 12 volt 100 amp. system, $85.00. Guaranteed no ex-police car units. Herbert A. Zimmerman, Jr., 115 Willow Street, Brooklyn 1, N. Y. K2PAT, ULstr 2-3472 or JAckson 2-2158.

BARGAINS: Reconditioned and fully guaranteed, HQ-100 $139.00; HQ-129X $158.95; HT-33 new Demo. $550.00; Heath Q Multiplier $8.49; NC-300 $279.00; KWM-1, 75A1, 75A2, NC-183D $289.00; Globe Chief 90 $44.00; Super PRO $94.50; Globe Scout 680 $89.95; HT-18 $39.95; RME-84 $59.95; Lysco 600 $59.50; Knight 50 Watt $29.50; National SW-54 $34.95; AF 67 $139.00; PMR 6A $79.95; Harvey Wells T-90 $128.95; Globe King 275 $179.00; Central Electronics 20A $189.00; Side Band Slicers $59.00; Heath AT-1 $22.95; Hallicrafters S-53 $49.00; KWS-1, Morrow MBR-5 $159.00; MBS 60A $159.50; DX-20 $29.95; NC-173 $129.95; NC-125 $139.50; NC-88 $89.95; 32V3 $450.00; 32V2 $349.00; Globe King 500A $425.00; HQ-140XA $189.95; NC-109 $179.95. We trade new and used. Write KEN-ELS RADIO SUPPLY, 428 Central Ave., Fort Dodge, Iowa or 128-31 Street, Cedar Rapids, Iowa.

MOON BOUNCE? Claim your own acre of the Moon's surface! Choice acreage left in the Mare Imbrum, the Moon's largest known crater. Authentic looking, two-color gag certificates with gold seal only $1.00 each with name and call inscribed free. Six for $5.00. Check or M.O. to Box CG, 1738-201 St., Bayside 60, New York.

DELUX CALL LETTERS: engraved, polished black phenolic laminate 2⅛" white letters on 3½" x 14" x ⅛" Blank. $1.75 P.P. J. Mudry, W8LWW, 3701 Germaine, Cleveland 9, Ohio.

PRESERVE YOUR HAM TICKET, Social Security Card, small photo, passes and anything else of value that is wallet size. We will laminate it in clear plastic, guaranteed for life. Lamination will prevent it from getting torn, soiled or frayed. Send your ticket or anything of value with $1. in stamps or cash for each item that you want preserved. 24 hour service. Send to Dept. HW, CQ Magazine, 300 West 43rd St., N.Y. 36, N.Y.

COAX—New surplus—RG-54ALL—58 ohm impedance—30' prepaid $1.00—Bob Farmer, Plainview, Texas.

TOROIDS: Uncased 88 mhy like new. Dollar each. Five $4.00 PP. DePaul, 101 Starview, San Francisco.

FOR SALE: Schematics for all military-surplus units $1.00 each. Dave Rumph Co., P.O. Box 7167, Ft. Worth, Texas.

TECH MANUALS, thousands in stock. Send large self-addressed stamped envelope for free listing. Lee Industrial Surplus, 28180 Van Born Rd., Inkster, Mich.

FOR SALE: Collin's KWS-1. H. T. Cervantes, Mt. Kisco, N. Y.

FOR SALE: Trav-Electric Super, inverter. Input 6VDC, Output 110 volts, 60 cycles AC; 60 watts continuous, 75 watts intermittent. Excellent, like new condition. First money order for $20. Rex Fritts, P.O. Box 812, Cedar Rapids, Iowa.

VIKING RANGER, used less than 100 hours, $175.00. W5ZVB, 6021 N.W. 58th Terrace, Oklahoma City, Oklahoma.

FIBREGLASS QUAD ARMS—Quad users, replace the bamboo fishin' poles with light weight, extra strength, weather proof fibreglass tubing. 2 piece arm (93 x 69"). Telescopes to 12' (15/16") OD x .030 wall— Wt. per arm approx 12 oz. 4 arm set, $29.95—8 arm set $58.95 (Illinois shipments add 3½%). Money back guarantee!!!!! No C.O.D.'s. Shipped Express or Freight Collect. Send check or Money Order to L & L Electronics Co. Box 455 Midlothian, Illinois.

SUPREME AF-100 200 watts AM-NFM-CW, 80-40-20-15-10. Xtal-VFO. 4165A final, excellent shape, $300.00 or best offer or trade for 75A3, 4 or HRO60. H. E. Davis, W8MTI, Onondaga, Michigan.

SX-100 $195. SX-101 $255., NC-300 $245., NC-183D spkr, $249. MRO-50T1 $249., HRO-60 6 coils $395., NC-66 $89., SP-600 $395., 75A-1 $249., 75A-4 $595., 51J-3 $575., KWS-1 $1095., BC-794B 1.2-40MC $159., HQ-160 $295., HT-32A $595., RAK-7 $65., BC-312 $49. Teletype converter, printers, reperforators, etc. Write Tom W1AFN, Alltronics-Howard Co. Box 19, Boston 1, Mass. RIchmond 2-0048. (Store: 60 Spring, Newport R.I., Fred W1JFF.)

CENTRAL ELECTRONICS SSB EXCITER 10B, $100.00., Central Electronics BC458 VFO, $25.00. Central Electronics SSB Slicer, $40.00. Full-size Wide-spaced 20 meter beam with match, $25.00. 36 foot A frame tower, $10.00. Parts for Kilowatt linear amplifier including 2 813 tubes $25.00. Parts for Kilowatt power supply, $25.00. W2WWS, 61 Laurel Road, Princeton, New Jersey.

RECEIVERS and electronic equipment. Hammarlund SP600-540-54MC-transmitters, power supplies, meters, transits, tubes 829, 4 x 150, teletype equipment. Everything for the ham. Gerald Hess, K2HWC; Jack Hess: Moravia, N. Y.

FOR SALE: Complete station. Hallicrafters SX-100 recvr, used 6 months $195. Globe Chief 90A (new look) and WRL 755-A VFO. Both never used, in original cartons $100 for the two. New York City Area only. Call KIngsbridge 6-5334.

FOR SALE: DM-37-D converted to 12V input, 625 V @ .225A output, $7; APS-13 420 Mc (converted), $20; SX-24, $75. Larry Latta, 3500 Main Street, Keokuk, Iowa.

Mobile Hams Citizens—Stop generator whine ignition noise regulator clicks $5.25 postpaid specify frequency. Ignition Kit, 19 Salem St., Cos Cob, Conn.

FOR SALE—Globe Scout 65B modulator built-in $60.00. Model 12 repeferator and 1A Kleinschmitt sending and receiving distributors with motors $60. Paskin, 6304 Forest Avenue, Ridgewood 27, N. Y.

CALL LETTERS engraved on laminate phenolic. Black, Walnut, Mahogany with white letters. 1⅞ x 8 x 3/32. For only $1.00 P. P. Jaeger Products, P. O. 3674, Phoenix, Arizona.

JOHNSON THUNDERBOLT, factory wired, best offer over $450; Hi-Gain tri-band vertical with radial kit $15; Johnson power reducer #250-29 $9; Universal KW-4M 52 ohm SWR indicator $35. K7EPD, 3850 East Elm, Phoenix, Arizona; CR 9-2824.

TUBES FOR SALE; new Eimac 4-400A's $25. New 250 TH's $15.00. 829 B's, $5.00. New and used 304 TL's and TH's price on request. J. H. Sales, 5408 Strattford Road, Los Angeles 42, Calif.

NATIONAL HRO-60T receiver 8 months old. Retailed new at $675 with speaker. Best reasonable offer takes. L. J. Gutter, 5875 N. Lincoln Ave., Chicago 45, Ill. Longbeach 1-2637.

ANTENNA ROTATOR—Famous JFD Roto King factory rebuilt & guaranteed for 90 days only rotator in its price class with continuous 360 degree control, original price, $59.95 SPECIAL $27.50. Ivory or Ebony cabinets limited quantity. Audio Visual Equip. Co. 2516 Ave. U Bklyn 29, N. Y.

SALE: HT-17, nice condition. Best offer. Roy Gale, Waterford, Conn.

FOR SALE: SX101 Mark III; $295 or best offer, shipping free, write RR 1 Box 148, New Augusta, Indiana.

SELL: SX-101 Mark III with speaker. Never used $275.00. Also have Heathkit 0-12 oscilloscope $50.00. Fred Salzman, 1128 Boynton Ave., New York 72, N. Y.

BARRY ELECTRONICS CORP.

TUBE HQS.

HAM — TV — INDUSTRIAL

• HIGHEST QUALITY • TOP BRAND - NAMES ONLY • BOXED • LOWEST, SENSIBLE PRICES • GUARANTEED • • SOME TYPES GOV'T AND MFR'S SURPLUS

0A2	.70	6AK5	.75	8CM7	.90	807W	1.50
0A3	.80	6AL5	.65	12A6	.40	811	3.50
0B2	.65	6AM4	1.90	12AE6	.65	811A	6.50
0C3	.70	6AM8	1.15	12AD6	.75	812A	6.50
0D3	.60	6AN5	2.00	12AT6	.70	813	8.50
0Z4	.65	6AN8	1.20	12AT7	.85	815	3.00
1A7GT	.90	6AQ5	.65	12AU6	.75	826	.60
1B3GT	1.05	6AR6	1.00	12AU7	.85	829-B	8.00
1B85	4.95	6AS7G	3.25	12AV7	1.10	830-B	.25
1N23B	.75	6AS8	1.15	12AX4GT	.95	832	3.75
1N23C	.95	6AT6	.50	12AX7	.85	837	1.00
1R5	.80	6AT8	1.15	12AY7	1.25	838	1.00
1S4	.80	6AU4GT	1.15	12B4A	.90	866A	1.50
1S5	.70	6AU5GT	1.50	12BA6	.70	872-A	2.00
1U4	.50	6AU6	.75	12BE6	.75	879/2X2	.25
1U5	.75	6AU8	1.20	12BH7A	1.05	884	.90
1V2	.65	6AV6	.60	12BK5	1.20	885	1.00
1X2B	1.10	6AW8	1.25	12BQ6GTB	1.55	889RA	75.00
1Z2	1.30	6AX4GT	.90	12BY7A	1.00	918	.85
2C39A	9.00	6AX5GT	1.05	12BZ7	1.05	954	.10
2C43	6.50	6B4G	3.50	12CU5	.85	955	.20
2C51	2.00	6BA6	.70	12CU6	1.55	957	.20
2D21	.65	6BC4	1.80	12DQ6	1.55	958-A	.25
2E22	1.75	6BC5	.80	12SA7GT	.95	991/NE16	.15
2E25	2.50	6BC8	1.40	12SC7	.85	1613	1.50
2E26	3.40	6BE6	.75	12SK7GT	.95	1614	2.75
2E35	1.50	6BG6G	2.25	12SL7	.75	1616	.60
2K25	9.95	6BH6	.75	12SN7GT	.90	1619	.17
2K26	34.00	6BJ6	.70	12SQ7GT	.85	1625	.20
2K28	30.00	6BJ7	1.00	12SR7	.65	1626	.15
2X2	.25	6BK4	2.50	12V6GT	.75	1629	.30
3A3	1.10	6BK5	1.10	12W6GT	1.00	1635	2.00
3A4	.70	6BK7A	1.15	12X4	.40	1654	1.70
3A5	.75	6BL7GT	1.35	19AU4	1.20	1852	.75
3API	3.50	6BN4	.85	19BG6G	2.25	2013	.50
3AL5	.40	6BN6	1.00	24G/3C24	3.50	2014	.50
3AU6	.75	6BQ6GT	1.35	25AX4GT	1.05	2050	1.25
3AV6	.60	6BQ7A	1.35	25BK5	1.25	ZB-3200	45.00
3B4	2.25	6BS8	1.45	25BQ6GT	1.55	5516	7.00
3B28	3.50	6BU8	1.00	25CD6GA	2.00	5517	.70
3BE6	.85	6BX7GT	1.35	25CU6	1.60	5528	4.00
3BC5	.85	6BY5G	1.15	25L6GT	.70	5557	5.00
3BN6	1.00	6BY6	.80	25W4GT	.95	5558	4.00
3BP1	1.50	6BY8	.90	25Z5	.65	5559	5.00
3BU8	.95	6BZ6	.89	FG27A	7.50	5588	35.00
3BY6	.85	6BZ7	1.40	FG32	4.50	5636	2.25
3BZ6	.85	6BZ8	1.60	35A5	1.00	5637	2.50
3C24	3.50	6C4	.45	35B5	.90	5638	2.50
3CB6	.85	6C6	.75	35C5	.75	5639	2.95
3CF6	.90	6C21	15.00	35L6	.85	5642	1.50
3CS6	.85	6CB5	2.75	35TG	1.75	5651	1.00
3D23	3.95	6CB6	.80	35W4	.50	5654	1.75
3DT6	.80	6CD6G	2.25	35Y4	.80	5656	3.00
3E29	6.00	6CE6	.90	35Z5	.65	5667	75.00
3S4	.85	6CG7	.85	50A5	1.10	5670	1.00
3V4	.85	6CG8	1.10	50B5	.90	5687	1.50
4X150A	7.00	6CL6	1.30	50C5	.75	5691	4.50
4BC8	1.40	6CM6	.90	50L6GT	.85	5692	4.95
4BQ7A	1.40	6CN7	.85	RKR-72	.25	5693	4.50
4BS8	1.35	6CS6	.85	80	.85	5703	1.00
4BU8	1.20	6CU5	.90	81	1.75	5704	1.00
4BZ7	1.40	6CU6	1.50	83	1.35	5718	1.00
4C35	13.50	6D6	.75	100-TH	9.50	5719	1.00
5ADP7	17.00	6DE6	.85	117Z3	.85	5725	1.00
5AM8	1.15	6DT6	.85	VXR130	1.00	5726	.70
5AN8	1.25	6DQ6	1.60	4X150A	7.00	5727	1.50
5AQ5	.75	6F4	2.25	274B	.40	5736	85.00
5AS8	1.20	6F6	.90	307A	.50	5744	.80
5AT8	1.15	6F7	.95	311A	3.50	5749	.85
5AW4	1.25	6F8	1.25	316A	.20	5750	1.75
5BK7	1.20	6H6	.45	337-A	2.75	5751	1.35
5BP1A	20.00	6J4	1.00	339A	5.95	5812	1.50
5BP4	3.00	6J5GT	.55	350A	2.00	5814	.75
5BQ7	1.40	6J6	.50	350B	1.50	5840	2.00
5C22	18.00	6K6GT	.95	357A	15.00	5847	7.00
5CG8	1.15	6K7	.75	371B	1.00	5875	1.00
5CP1A	20.00	6K8	1.00	394A	3.00	5879	1.00
5JP1	4.00	6L6	2.00	396A	2.00	5881	2.75
5J6	1.00	6S4	.75	401A	1.50	5963	1.00
5LP1	7.00	6SA7GT	1.05	403A	.90	5965	.90
5R4GY	1.00	6SC7	1.05	403B	2.50	6004	.85
5RP1A	12.00	6SJ7	.75	404A	7.00	6005	1.50
5T4	1.10	6SK7GT	.90	407A	2.95	6012	3.40
5T8	1.20	6SL7GT	.90	408A	1.75	6072	2.50
5UP1	12.50	6SN7GT	.70	417A	8.00	6073	1.00
5U4GB	.75	6SN7GTB	.90	420A	6.75	6080	3.50
5U8	1.15	6SQ7GT	.85	434A	4.00	6096	1.00
5W4GT	.90	6T4	1.30	446A	.50	6100	1.75
5Y3GT	.60	6T8	1.15	450-TL	43.00	6146	4.50
5Z4	1.25	6V6GT	.75	673	11.50	8012	.50
6A7	1.00	6W4GT	.85	703A	.75	8013	2.50
6AB4	.80	6W6GT	1.00	717A	.20	8020	2.00
6AC7	.75	6X4	.60	723A/B	5.00	9001	.50
6AF4	1.45	6X5GT	.70	758-A	1.00	9003	1.15
6AG5	.65	6X8	1.10	TR-722	.90	9004	.20
6AG7	.95	6Y6G	1.00	803	1.50	9006	.15
6AH4GT	1.05	7BP7	5.00	805	5.00	AX9903	17.50
6AH6	1.40	8AW8A	1.40	806	7.00		
6AK4	1.50	8CG7	.90	807	1.15		

(FOR TERMS: SEE OUR AD ON OPPOSITE PAGE).

BARRY ELECTRONICS CORP.

512 Broadway, Dept. C9, N. Y. 12, N. Y.

Telephone: WAlker 5-7000

For further information, check number 46 on page 126.

A RADIO SHACK EXCLUSIVE!

CLASS D CITIZENS BAND TRANSCEIVER KIT

COMPLETE *with Antenna and Microphone* **$39.95** $5 Down $5 Monthly

2 for $77 *$8 Down $7 Monthly*

- FCC approved for fixed or mobile operation. No FCC exam or license required.
- Complete kit includes antenna, high-impedance mike with 2-way desk stand, crystal, prepunched chassis, cabinet enclosure (brown hammertone finish) All parts brand new. No seconds.
- Easy to build — detailed instructions included.
- 22 channel crystal controlled transmitter. 22 channel receiver. Up to 5 watts input. 5 tubes.

SAVE $11.55! ON A GONSET

PUSH-TO-TALK CARBON MIKE **$4.95** Reg. $16.50

For mobile or Gonset communicators. Kink-proof retractable cord.

RADIO SHACK CORPORATION
730 COMMONWEALTH AVE., BOSTON 17, MASS.

Please send me: 9C

- ☐ Class D transceiver kit, 45DX136 @ $39.95
- ☐ 2 of the above @ $77
- ☐ Extra Crystals, 41D218 @ $2.95 each
- ☐ Check ☐ Money Order ☐ C.O.D.

NAME_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

For further information, check number 47 on page 126.

RECONDITIONED EQUIPMENT: NEW GUARANTEE: TONS of fixed station equipment: 75A1 $265.00; S40 $65.00; S53A $69.95; S76 $109.00; SX-88 $429.00; SX100 $219.00; SX101 $319.00; HQ129X $149.00; HQ-140X $179.95; HRO60T $385.00; NC98 $114.00; NC125 $139.50; NC300 $269.00; many speakers, slicers, calibrators etc., inquire. Also have HUNDREDS of transmitters. MOBILE the inexpensive WRL way: Super 6 $39.50; Super 12 $54.95; G-66 $149.00; TBS50's (specify low or high impedance microphone) $50.95; MBR-5 $129.00; MB560 $125.00; A54H $85.00; AF67 $139.00; PMR6A $79.00; PMR7 $119.00; G77 $99.00, ATC-1 $59.50; MC-55 $38.50; SRT-120 $89.00; power supplies $5.00 up. Terms, trials, trades. Leo-WØGFQ. WRL Box 811, Council Bluffs, Iowa.

FOR SALE Heath "Apache" $200; NC-98 with spkr and preselector $106; D-104 mic and push to talk stand $15; 56', 3 section Tri-Ex crank-up tower $110; Hy-Gain 3 element tri-band beam $85; AR-22 $18; low pass filter $12; 60' RG-8U $12; Globe Chief $35; coax-relay $10; Dan Duffin, K6KCV, 11722 Martha Ann, Los Alamitos, Calif.

NC-183-D—Excellent $235. W4PRM, Chipman, 816 Melrose Street, Winston-Salem, North Carolina.

MOBILE HAMS: "BUT-KETCHER COIL"—Mobile antenna loading coil—80 thru 10 meters. Ruggedly built utilizing Micarta. $14.50 postpaid U.S. only. Mfg. by: C. V. Bednar, W5UMC, 1235 North Shepherd Drive, Houston 8, Texas.

FOR SALE: magazines, electronic gear. Send stamped envelope for list. Thomas Corso, 34 Vanderlyn Dr. Manhasset, New York.

FOR SALE: ONE Gonset Comm. II, 12 VDC. Fan added for cooling. Good condx. $115.00. Must sell. Write, wire, or indian runner to; W9VYD, 1419 Fifth Ave. SE, Cedar Rapids, Iowa.

SALE: Heath DX-40 with VFO. In good condition; $80. Rex McCullough, K5LZH, 509 N. Morton, Hollis, Oklahoma.

FOR SALE: BC 312 receiver, $30.00 or trade for SCR 522, Stan Stern, K2VJP, 130 Fayette St., Perth Amboy, N. J .

FOR SALE: DX-100, First offer $175.00 takes. Other gear. Lyle Meredith, 503 Maple, Blackfoot, Idaho.

SALE: Collins KWS-1 and 75A-4; both perfect. O. J. Mills, 11669 McDonald St., Culver City, Calif. Phone EXmont 7-5981.

CRYSTALS, MARINE, all frequencies .005% $2.95. "SSB Package" sets of 5 fundamental mixer crystals per June 1958 QST and QST SSB handbook, FT-243 holders $8.95, HC-6U hermetics $11.95. "Package" accurately matched filter sets $6.90. All crystals & many parts for May CQ "Transistorized Receiver." FT-243. 01% tolerance any kilocycle 3500 to 8600 $1.49. Novice all frequencies 99¢. Add 5¢ per crystal for mailing. (9¢ Airmailing) Bob Woods GIlbert 8-3139, 2164 Parkway, El Monte, Calif.

CRYSTALS AIRMAILED: Mobile, Net, Citizens, MARS, Novice, etc.—FT-243 .01% any kilocycle 3500 to 8600—$1.49. all novice frequencies 99¢. 1700 to 21,500—$1.95 .01% hermetics $2.50, .005% hermetic $3.50. Citizens overtones .005% FT-243 $2.50, hermetic $2.95. Airmailing 9¢ per crystal. Marine .005% $2.95, specify holder. Crystals? Ask us, we have them all. Crystals since 1933. C-W Crystals, Box 2065, El Monte, Calif.

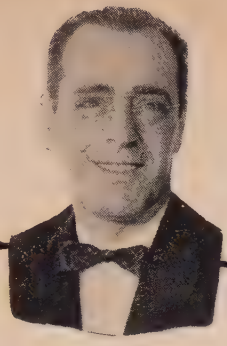
FOR SALE: Collins 75A-2-A, 3Kc. mechanical filter, $325.00. B&W 5100-B with 51SB-B, $540. Both for $820.00, cash, FOB. Both in excellent condition. First check takes them. Al Stancel, W4PHY, 1411 N. 7th Ave., Lanett, Ala.

SALE: DX-100 $170; SX-71 Rcvr $120. Write Lynn Shaeffer, 321 South Second St., Apollo, Pa.

GONSET OWNERS. Rack for mounting communicator I, II, or III over transmission hump. Just the right position for convenient operation. No bolts or adjustment, in and out in seconds. $4.95 post paid. Shipping weight 4 lbs. Strid Electronics, 234 Washington St., North Easton, Mass.

FOR SALE: Back issues of R & T News. Send for list. Max Holland K8AMV, 126 Orange St., Urbana, Ohio.

VHF NEWS BULLETIN—10 issues, $1.00 "QSO," 67 Russell, Rahway, N. J.



NO CASH NEEDED

WITH RADIO SHACK'S EASY-PAY-PLAN*

W1RVQ

Al Coe *Radio Shack Manager of Amateur Sales

complete hallicrafters *line in stock*

IMMEDIATE DELIVERY

20% *over allowance on your trade-in*

*That's right! At RADIO SHACK you can have the Hallicrafters model you want . . . now, without delay! No cash needed . . . your trade-in, if 10% or more of total purchase, covers the down payment. To make doubly sure it does RADIO SHACK is now offering a big 20% over-allowance on all trades. This bonus allowance is added on to RADIO SHACK'S usual unbeatable allowance. Send for RADIO SHACK'S trade-in-deal today. Mail the coupon below. You'll get an offer by return mail that can't be beat by anyone, anywhere!

HT-32A
order #45DX317
$695. net.

SX-101 IIIA
order #45DX303
$399.50 net.

FREE!

12 MONTHS SUBSCRIPTION TO BARGAIN BULLETINS

Page-after-age, month-after-month. Exclusive bargains in HI-FI, AMATEUR RADIO, LP RECORDS, POWER TOOLS, OPTICAL GOODS and TEST EQUIPMENT. Write today.

COMPLETE GUIDE TO ELECTRONIC PARTS BUYING

250 pages, 8½ x 11, illustrated handbook. Articles, engineering data, plus buying guide. Over 30,000 items. Available Sept. 1

FILL IN – CLIP – MAIL TODAY!

Radio Shack Corporation DEPT. 9C
730 Commonwealth Avenue, Boston 17, Mass.

PLEASE QUOTE ME AN ALLOWANCE ON MY MODEL _____
I WOULD LIKE TO TRADE FOR THE FOLLOWING HALLICRAFTERS
MODEL _____
NAME _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Please send me:
☐ Bargain Bulletins for 1 year FREE!
☐ 1960 Guide to Electronic Buying @ 35¢
☐ Used Equipment List

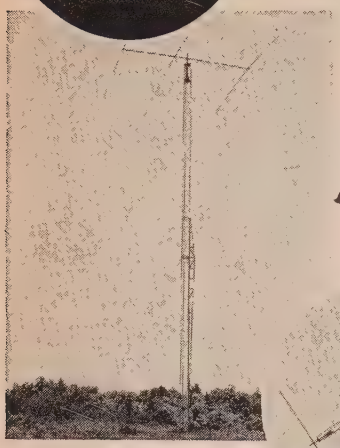
RADIO SHACK CORPORATION

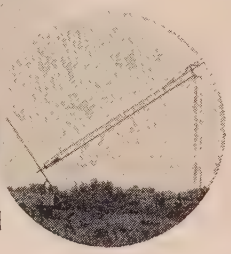
167 WASHINGTON STREET, BOSTON 8, MASS.
730 COMMONWEALTH AVENUE, BOSTON 17, MASS.
230-234 CROWN STREET, NEW HAVEN 10, CONN.

For further information, check number 48 on page 126.

New ROHN "FOLD-OVER" TOWER

the BEST in antenna towers... now EVEN BETTER!





DO YOUR WORK ON THE GROUND WITH ROHN FOLD-OVER"

- Hot-dipped galvanized after fabrication
- Structurally sturdy enough for all sizes and types antennae
- Excellent workmanship — superior design — yet economical in cost
- A complete tower made especially for amateur use
- FREE literature and nearest source of supply gladly sent on request

ROHN *Manufacturing Company*

116 Limestone, Bellevue, Peoria, Ill.

"Largest Exclusive Manufacturer of TV-Communications Towers"

For further information, check number 49 on page 126.

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way — with an **Instructograph Code Teacher.** Excellent for the beginner or advanced student. A quick, practical and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Speed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

ENDORSED BY THOUSANDS!

The Instructograph Code Teacher literally takes the place of an operator-instructor and enables anyone to learn and master code without further assistance. Thousands of successful operators have "acquired the code" with the **Instructograph System.** Write today for full particulars and convenient rental plans.

INSTRUCTOGRAPH COMPANY

FOR SALE: Collins 51J3 with Vernier Tuning Kno Mint condition $675. 32V2 $325. B&W 51SB $185. Bo for $485. Ranger $185. Central Slicer "B" 75. MM $90. Measurements Corp "80" signal generator $27 Morrow Portable package. (transmitter receiver, A. power supply and 12 volt supply) $450. Tecraft meter converter $23. Gonset 2 meter communicator $195. Sid Gogel, 1096 Laux Place, No. Bellmore, L N.Y. SUnset 1-0568.

JOHNSON KW good condition. No desk—$895.00. W TVE, Fenton, Iowa.

FILL THOSE PEAKS: Capacitors 3000V 120 mfd. C Pyronol used in very good condition. $35.00 packi $3.00. W8LTF, 831 Antoine, Wyandotte, Mich.

ALUMINUM for every Ham need. Write to Dick's, Cherry Avenue, Tiffin, Ohio for list of tubing, ang channel, castings, plain and perforated sheet, and co plete beam kits.

SELL: Hammarlund HQ-110C Rcvr and spkr. Excelle condx. $160. M. J. Stansell, P. O. Box 8347, Gun FB, Ala.

TRY BOB GRAHAM, W1KTJ, for the best in new used ham equipment. We buy-sell-trade-swap-rent-servi install. Graham Company, Reading, Massachusetts 2-4000.

SACRIFICE! Going to college and must sell Gl Scout 65A $60. Globe Linear LA-1 $95. Collins 31C 2VFO $75. Best offer takes all three F.O.B.! K9H 1134 Windiate St., Manitowoc, Wis.

NATIONAL NC 125 Receiver with matching speaker, perfect condition, $95. Peter Way, 100 Memorial Dri Cambridge, Mass.

FOR SALE: NC-183D used 20 hours in carton. W sacrifice $250.00. Tom Jones, 55 Westbrook Road, So Hadley, Mass.

BEAM: Mosely TA-33 trapmaster, perfect, with n stainless hardware. $60.00. W3SW, Box 625, Sil Spring, Maryland.

OSCILLOSCOPE: Heath O-7. Professionally wired, l new $37.50. W3SW, Box 625, Silver Spring, Maryland.

WANTED

WANTED: All types of communications receivers, tra mitters, test equipment, teletype equipment, factory bu amateur gear. Cash or trade for NEW HT-32, Valia Thunderbolt, SX-101, NC-303, Fisher HI-FI, etc. W Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston Mass. (RIchmond 2-0048) Store: 60 Spring St., Ne port, R. I. (VIking 7-3435, Fred W1JFF)

WANTED: TELETYPE TG-7 and Model 15 and pa printers and reperforators, etc.; COMM'NS REC'V AND XMTRS, e.g. BC-610-E, -I, BC-939A, Collins 5 17L3, -4; R-388 and R-390/URR; 18S-2, -3; ARN-14 -30; APR-9, -10, ARC-21, 27, etc.; APS-31, -33; and TE EQP'T, with TS- or 1- prefix. We pay freight. AMB INDUSTRIAL CORP., 75 Varick St., N. Y. 13, N. Y

WANTED: USED commercial broadcast transmitters the 500 watt to 5000 watt range. Frequency ranges mc to 150 mcs acceptable. Units By Collins and Ga particularly desirable. Commercial Power Amplifiers power supplies also wanted. Write Box BB, CQ, 300 W 43rd Street, New York 36, N. Y.

WANTED: Military and Commercial laboratory test measuring equipment. Electronicraft, Box 399, Mo Kisco, N. Y.

WANTED: Cabinet Hallicrafters SX42 or SX62 pl state your price prepaid to W7CX.

WANTED: Gonset two or six meter communicator. Ca Graham Company, Reading Massachnsetts.

QSL

QSL's-SWL's: That are different, colored, embossed c stock, and "Kromekote." Samples 10¢. K8AIA, Box 9

QSL's: Samples, dime. Print Shop, Corwith, Iowa.

RUBBER STAMPS for hams, sample impressi W9UNY, C. W. Hamm, 542 N. 93, Milwaukee, Wiscon

L's, SWL's, VHF's, XYL-OM's. (Sample assortment prox. 9¾¢.) Covering designing, planning, printing, anging, mailing, eye-catching, comic, sedate, fatabu-s. DX-attracting, prototypal, snazzy, unparagoned, ds. Rogers KØAAB 737 Lincoln Ave., St. Paul 5, nn. Also glamorous, pulsating, super-passionate. ow!)

L SAMPLES. Dime, refundable. Roy Gale, Waterford, nn.

L's-SWL's: High quality, reasonable prices. Samples. b Teachout, W1FSV, 204 Adams Street, Rutland, rmont.

L's—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. mples, 10¢, with catalogue, 25¢.

L's-SWL's, samples 10¢. Malgo Press, 1937 Glendale enue, Toledo 14, Ohio.

L-SWL: $1.00 per 100. Samples dime. Riesland HTN, Del Mar, Calif.

OSSY 3 color QSL cards 100—$4.50. Free sampler. tgers Vari-Typing Service, 7 Fairfield Road, New nswick, N. J.

L's Samples 15¢. Sims, 3227 Missouri Ave., St. Louis Mo.

EATIVE QSL CARDS. Personal attention given. Free mples and catalog. Bob Wilkins, Jr. Box 1064-2, scadero, California.

L's??? LARGEST variety samples 25¢ (refundable). LLBOOKS (fall issue) $5. "Rus" Sackers, W8DED, 218, Holland, Mich.

SPEL QSL cards. Ham Gospel tracts. Samples 10¢. kers, W8DED, Holland, Mich.

L's SWS's—4 colors, glossy cards, brilliant, sparkling s. 100 $3.50. Dick, WBVXK, 1019 Arthur, Mt. asant, Mich.

L's MODERN DESIGNS, reasonable. Paye, W4ZKK, Avondale, Cocoa, Florida.

SWAP or SELL

DIO MAGAZINES. Buy, sell, trade. Bob Farmer, inview, Texas.

LL OR SWAP: Mobile-Rig-Gonset. G-77 and G-66 B/ h pwr Supply and Mike Master Matcher (6) Z Match. EWY, 522 South 22 Ave. East, Duluth, Minnesota.

MISCELLANEOUS

ESERVE YOUR HAM TICKET, Social Security Card, ll photo, passes and anything else of value that is let size. We will laminate it in clear plastic, guaran- for life. Lamination will prevent it from getting , soiled or frayed. Send your ticket or anything of e with $1 in stamps or cash for each item that you t preserved. 24 hour service. Send to Dept. HW, CQ gazine, 300 West 43rd St., N. Y. 36, N. Y.

ORATE YOUR CAR WINDSHIELD WITH YOUR LL LETTERS. Attractive 1" letters and numbers avail- in gold or black. Complete single set 75¢, two sets $1.25. Include name, call, address and color preference. ey refunded upon return of unused decals if not sfied. All orders must be prepaid. Send to Box RJ, CQ Magazine, 300 West 43rd St., N. Y. 36, N. Y.

O COLOR CERTIFICATE. Attests to tongue-in-cheek ership of one acre of the moon. Ideal gift or for of club, shack, bar or room. Name and call inscribed . $1.00 each, 6 for $5.00. Box G, 1738 201 St., Bay-60, N. Y. Check or M.O. only.

MS. Learn Calculus. Powerful modern mathematical . Easy practical lessons, first four $1. Mathco, 4256-5 mor, Cincinnati 17, Ohio.

AWARDS—Official looking gag certificates "Worked Neighbors"—"World's Biggest Lid"—"Radio's Biggest tist"—"Nothing Ever Works" only $.50 each Post-d or complete set of four with envelopes for remail-—$2.00 PostPaid. Dil Novelty Co.—P.O. Box 156, nsey, N. J.

GENERAL LICENSE seeks position in New York or vicinity where technical background plus office ls can be applied. Box 1602, Grand Central Station, York 17, N. Y.

BC 603—20 to 27 MC FM RECEIVER. See Sept. and Oct. 1958 issues of "CQ" for conversion to 20-50 MC and AM
UNUSED ..... ea. $12.95

BC-604—TRANSMITTER—20-27 MC FM $7.95
UNUSED

Set of 80 crystals for the above ..... per set $5.95

F.T.—237 Mount for above XMTR and Receiver $4.95
NEW ..... each

AN/ART-13 100 WATT TRANSMITTER
(Removed from Aircraft)

Designed to provide radio communication by voice, (MCW) or CW telegraphy. Class "B" audio modulator system capable of modulating the carrier at least 90% on voice or MCW. Incorporates automatic tuning mechanism which may be used to select any one of 11 frequencies, range 2000 KC to 18,100 KC. Frequencies 200 KC to 1500 KC range is provided by addition of oscillator O-16/ART-13A. $39.50
(Government original cost $1,000.00)

Less meters $24.50
O-16 Low frequency oscillator. $5.95

RADAR SYNCHRONIZER UNIT with 7 ea. 717 A's only, 12-SO239 Coax. Chassis, Connectors, Relays, Switches, etc. ..... ea. $2.49
4 for $8.00

BC-669—Six Channel Crystal Controlled, 50 Watt Radio Telephone, 1600 to 4500 KC. Ideal for boats or land station. Less power supply $29.50
Used

1E19—5 PIECE TEST SET consisting of Signal Generator 100-156 MC, Field Strength Meter, 0-1MA Tuning Meter, Battery Box and Chest. $19.95
EXC. ..... per set

T-17 CARBON HAND MIKE —200 ohm. Press-to-Talk Switch. $5.95
BRAND NEW

ID 169/APN-12. SCOPE INDICATOR. Complete with tubes and conversion instructions for 110V 60 cyc AC. BRAND NEW $9.95

WRITE FOR BARGAIN FLYER

R W ELECTRONICS

2430 S. Michigan Ave., Dept. CQ, Chicago 16, Ill.

Phone: CAlumet 5-1281

For further information, check number 51 on page 126.

Look for this emblem on CQ Handbooks in your favorite bookshop or ham dealer.

with a

P&H COMPRESSOR-AMPLIFIER

It's a fact — 100% modulation on most ham rigs is a "sometime thing". Uncontrolled, instantaneous audio peaks can ruin an otherwise clean signal. THERE'S A SIMPLE SOLUTION — Install a P&H compressor-amplifier in the mike line of any AM, SSB, DSB or PM transmitter — Adjust audio gain for full 100% modulation and forget it! TALK POWER IS UP — FLATTOPPING IS GONE. The net result is the CLEANEST, MOST POTENT AUDIO your rig is capable of. Single knob control. Works on AVC principle — like broadcast compressors. TWO MODELS: The AFC-1 (3x3x5") requires an external power source and has a built-in 90-3500 cycle band pass audio filter . . . sells for only $32.95. The AFC-2 (5x5x7") has a built-in power supply, a switch controlled (Broad-Medium-Sharp) audio filter and costs you only $54.95. Also available the AFC-2CW, a sharp filter model for CW reception or mike input on filter exciters.

If you are interested in what either of these "Little Grey Boxes" can do for your phone signal . . . Or what smooth, instantaneous, non-blasting phone and CW reception you can get from that older model receiver with a P&H compressor in the speaker line . . . See your dealer, or drop a card to DEPT. R-11.

P&H ELECTRONICS INC.
424 Columbia Lafayette, Ind.

For further information, check number 52 on page 126.

AUGUST TUBE SPECIALS

4X150A	—	6.95	5R4GY	—	.95
6AG7	—	.95	6AQ5	—	.65
5670	—	.89	5686	—	1.50
5751	—	1.25	5763	—	1.65
0C3	—	.45	OD3	—	.30

Other types at equally low prices.

COME IN AND SAY HELLO!

NASSAU ELECTRONICS, INC.
471-473 JERICHO TURNPIKE, MINEOLA, L.I., N.Y.
PHONE PI 1-8680

Tuning

Tuning under the Testing and Adjustmen section of the SB-10 manual is done with a connections made, but with the Ranger in th Tune position. No plate voltage is needed t the final of the transmitter to test and adjus the SB-10. The drive control should be set a 3 or 4; the Buffer should be set at a minimur capacitance setting. After the initial testing an aligning, the drive is advanced until there no further increase in meter reading on th SB-10; then the drive control is reduced t just below this point. The rest of the tunin and operating is straightforward and easil understood from the SB-10 manual.

If no scope is available at the station, th adjustment of the phasing network with *vtvm* by measuring the *ac* voltage ratios pins 5-1 and 3-7 of the phase shift networ may be accomplished as described in th trouble shooting section of the manual. Mea uring *ac* voltages on the plates of the modu lator tube for proper balance should be o special interest. When placing the transmitte on the air, a means of measuring output to th antenna, when loading the final is helpful, the maximum output is not always at th heaviest loading of the final.

Switching

Switching from AM-CW to SSB can be a complished in the following manner. A fi pole-two position switch is mounted on th upper left side of the panel. Room is ava able just above the bias rectifier section prev ously referred to. The screen voltage and bi voltage must be returned to class C. The OH tubes will not fire at normal voltage and ne not be switched out. The voltage is just r turned to normal. The VR-75 is automatica removed by the open relay in the SB-10. T plus side of the meter terminal SH3 is lift from ground and run through the new waf switch. The resistor R37 is shorted during S operation with the meter resistor being lift from ground and run to the switch as sho in the diagram. A jumper is run between t two external connecting plugs during A operation, restoring the *rf* path to normal. T desired resistor in the bias rectifier is switch in or out as needed. This should make a co pletely compatible little rig with a minimu of cash outlay.

MONTE CARLO [*from page* 40]

ever-present DX bug was at hand, and powerful urge to work rare DX was alwa present. True, it was nice to call CQ and cho between a UM8, an AP2, and a 9K2 calli but this enviable situation was counterbalanc by the great horde of eager-beavers who w going to work 3A2AF or die in the attempt.

call to a DX station from 3A2AF was invariably a waste of time, because the reply could not be heard in the ensuing pile-up of rude mannered lids calling 3A2AF. Directional CQ's were a similar waste of time. A short, snappy "CQ-USA ONLY" would be answered by a horde of clicky, blurpy DJ, YU, UA, G, DM, etc., etc. of the most persistent type who would not be turned aside by anything short of closing down the station. For every good operator there were ten that would call zero-beat during a QSO or pass along the "handle here is . . ., I spell . . ." routine, or the equally deadly "QSL via Box 88 88 88 Moscow Moscow here QSL sure, etc., etc." monologue, and insist on an exchange of names, while the rest of the DX-hogs were making miserable noises on the frequency.

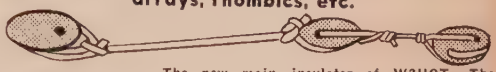
The "gold star" for general operating excellence must be given to the W-operators! In spite of the fact that no one country had a monopoly on good or bad signals, the run-of-the-mill DX conduct and behavior of the W-gang was far above the average. This fact is easily proved since it was possible to work approximately twice as many W stations per hour as compared to European stations. This observation merely confirmed a fact noted on previous DX-peditions at FP8AC (1950) and 7B4QF (1951). Thus in spite of the tremendous increase in active amateurs in W-land, the operating standards seem to remain reasonably high.

It must be emphasized that single sideband proved to be the fastest and most reliable means of working DX at 3A2AF. Between 80 and 100 contacts per hour were common on days of good propagation. Clean operating, and the lack of annoying hetrodynes proved conclusively to 3A2AF that as the state of the art advanced, SSB would completely abolish *am* to the junk heap. If the c-w signal could be heard, the SSB signal could be heard! This did not prove true with *am,* as relatively few *am* stations from the U.S.A. could be read through the general background noise and racket on the band.

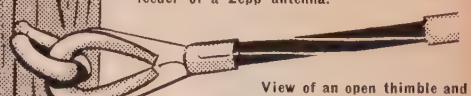
And now the Great Adventure is over. 3A2AF is secured. The antenna poles are down, and the hotel room is dark and empty. The tried and true equipment is on the high seas, headed back home. No more will 3A2AF drag out of bed at 0445 *G.M.T.*, head the Microbus into the dim glow of the sun rising behind the Monte Carlo, drive the short, winding 7 kilometers along the *Basse Corniche,* passing Eze-sur-Mer, Cap D'ail, and the striped highway marker denoting the border of Monaco. The pleasure of entering the sleeping hotel at 0515 *a.m.*, riding up the midget elevator to "Chambre 39" on the fifth floor, turning on the equipment and scanning the band is past. No longer will a short "CQ USA, this is Monte Carlo calling," spin the band into a bedlam of activity. This is all in the past, and all that are left are pleasant memories of many warm friends, a pleasant

NON-METALLIC GUY LINE – PERFECT FLEXIBLE INSULATOR – REVOLUTIONIZES HAM RADIO & TV ANTENNA SYSTEMS

Non-inductive, non-conducting, non-absorbing Glas-Line isolates systems from directional arrays, rhombics, etc.



The new main insulator of W3UCT. The Glas-Line is between the two egg insulators running to the lower left. The copper link between the center egg insulator and the upper right egg insulator is for the dead-end feeder of a Zepp antenna.



View of an open thimble and eye bolt for coupling the Glas-Line guy wire to a tree. GLAS-LINE cannot rot, will not shrink, stretch or sag . . . has high breaking strength of over 500 pounds.

100′ SPOOL $2.98 Plus 50¢ for postage & handling

600′ REELS $17.34 Plus $1.00 for postage & handling

Announcing New 'SUPER' GLAS-LINE with 1,000 LB. TENSILE STRENGTH

$5.35 100′ SPOOL Plus 50¢ for postage & handling

$31.54 600′ REELS Plus $1.00 for postage & handling

AVAILABLE AT THE FOLLOWING:
Alaska Radio Supply, 307 Seward St., Box 2538, Juneau, Alaska
ALPHA ARACON Radio Co., Ltd., 555 Wilson Ave., Downsview, Ontario Canada (Toronto 29 Adelaide St.)
Amateur Radio Supply Co., 224 Cedar St., Seattle, Washington
Arrow Electronics, 65 Cortlandt St., New York 7, N. Y.
Barry Electronics Corp., 512 Broadway, New York 12, N. Y.
Bob & Jacks, 611 Forest Ave., Des Moines 14, Iowa
Busacker Elec. Equipt. Co., Inc., 1216 W. Clay St., Houston, Tex.
M. M. Duffy Co., 2040 Grand River Ave., Detroit 26, Michigan
Fort Orange Radio Dist. Co., 904 Broadway, Albany 4, N. Y.
Hargis-Austin Inc., 410 Baylor St., P.O. Box 716, Austin, Texas
Harrison Radio Corp., 225 Greenwich St., New York 7, N. Y.
Harvey Radio, Inc., 103 W. 43 St., New York 36, N. Y.
Henry Radio, Inc., 11240 West Olympic, Los Angeles 64, Cal.
Henry Radio Stores, Butler 1, Missouri
Offenbach & Reimus Co., 1564 Market St., San Francisco 2, Cal.
Scott Radio Supply Co., 266 Alamitos Ave., Long Beach 2, Cal.
Electronic Wholesalers Inc., 61 N.E. 9th St., Miami, Fla.
Electronic Wholesalers Inc., 2345 Sherman Ave. N.W. Wash. D.C.
Reno Radio Co., 1314 Broadway, Detroit, Mich.
Amateur Electronic Supply, 3932 W. Lisbon, Milwaukee 8, Wisc.

Send check or M.O. No C.O.D.'s please.
DEALER & DISTRIBUTOR INQUIRIES INVITED.

THE GLAS-LINE CO.

2751 NOSTRAND AVENUE
BROOKLYN 10, NEW YORK • ESplanade 7-2260

For further information, check number 53 on page 126.

ALL BAND TRAP ANTENNA !

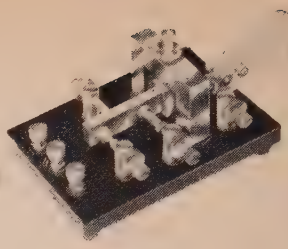
Best for All-Band Receivers Low S.W. R. 80-40-20-15-10 5″ x 1″ — 3-ounce Molded Traps No metal or losses in field

For ALL Amateur Transmitters Guaranteed for 300-watts For Pi-Net or Link-direct feed Light — Neat — Weatherproof

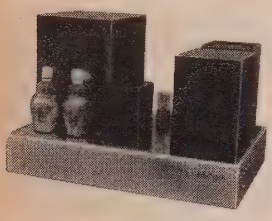
Complete as shown with 87 ft. — 72 ohm feedline — 102 ft. copper-weld. Eliminates inefficient multiple antennas. Gets beam results on 20-15-10. No tuners, loading troubles or hay-wire house appearance. Excellent for shortwave listeners. Looks good, works good and lasts. For novice and all class amateurs.
80-40-20-15-10 Complete, assembled $12.95
40-20-15-10 50 ft. Antenna, assembled $11.95
20-15-10 Dual Trap, 30 ft. Antenna, assembled $18.95
SEND ONLY $3.00 (cash, ck., mo) and pay postman balance COD plus postage on arrival, or send full price for postpaid delivery. Available only from:
WESTERN RADIO • Dept. AC-9 • Kearney, Nebraska

New Amateur Equipment

The Elkey



Poucel Electronics of Babylon, New York are now offering an attractive, ruggedly constructed, functional basis for that electronic key you've been thinking about building. Elkey, as it is called, has quite a few interesting features you should know about. The Elkey is constructed of high quality components. The yoke arms and posts are of chrome plated solid brass, the paddle is clear lucite and the base has rubber feet to prevent "walking." Interesting Note: Elkey features completely adjustable stops and spring contacts. For further data mash A on page 126.

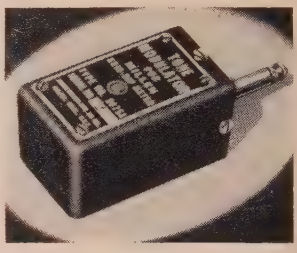


New Heathkit KW Power Supply

Any ham planning a high power station will find the new Heathkit KS-1 power supply suitable for supplying the plate power to most any type of rf amplifier in the medium to high power range. The KS-1 can be used to power a 2 kw P.E.P. linear amplifier or a complete plate modulated kilowatt phone rig. It will deliver output at either 1500 or 3000 volts dc at a maximum current of 500 ma at each voltage. For more dope, circle B on page 126.

Tone Modulator for Grid-Dipper

James Millen has announced their new model 90751 tone modulator for grid-dippers. This unit is a small package containing a transistor oscillator and a mercury battery, which plugs into the GDO phone jack, and provides an 800 cycle tone for applications requiring a modulated signal. The modulator is automatically turned on when it is plugged into a grid-dip meter. For more detailed data, gore C on page 126.



New Rohn Heavy Duty Tower

The Rohn Manufacturing Company of Peoria, Illinois, has come forth with this new heavy duty tower which is self supporting to heights of 130 feet. The tower is constructed by using 13 different sections of varying size, weight, structural strength and taper. The individual sections can be used in making additional combinations to build self supporting towers of variable heights and structural capacities so as to fit the particular need as required by the antenna system selected. For more, greatly detailed information, merely obliterate D on page 126 and we'll see that you get all the facts. Just facts.

BOOK REVIEWS

Practical Electronics by Robert Hertzberg ..... **Arco, $2.50**

This is a wonderful pictorial introduction to radio and electronics. It covers almost every aspect of the field, from ham radio to hi-fi. For instance there are chapters explaining about the electron microscope, microwaves, transistor short wave sets, code practice, oscilloscopes, crystal radios, test equipment, photo flash units, power supplies, different types of radio components, getting better sound from TV sets, and on and on. This is the sort of book to build up an interest in the radio hobby without discouraging by being too technical. It is hard to think of a better book to have around the shack for visitors to look at or to get the kid across the street fired up with the enthusiasm to get his ticket. You'll enjoy it too.

Basic Electronics by Bernard Grob ..... **McGraw Hill, $9.25**

Nine twenty-five is quite a tab for a basics book, particularly since there are so many on the market. Unfortunately, many of the so called "basic" books are over illustrated pap and don't really give the earnest student of electronics much to get his teeth into. This book, written by an instructor at the RCA Institute, is obviously written for use as a text book for it goes about the teaching of electronics in a good businesslike way, starting at the beginning, explaining everything quite clearly, and then giving questions at the end of each chapter. If you are going to really learn about electronics, and you should if you have your ham ticket, then it behooves you to get down to work and do it. This book steers away from the math approach to instruction and should be easy to assimilate by any high school grad.

...just couldn't wait

The carpenters are still sawing and hammering electricians are busy wiring—everyone is bustling a helping to make your "HAM HEADQUARTERS, U even bigger and better than ever!

But, we just couldn't wait to show you the compl exciting line of National receivers, and to tell you ab the sensational savings we bring you!

Hurry on in—let me prove why you should have new National receiver, today! (Or send me your ord and see for yourself right in your own shack.)

I give you brand new, factory fresh equipment, the easiest of terms, the very lowest prices, highest allow- ance for your present gear, and downright satisfying service. In short, you always get more for your money at "HAM HEADQUARTERS, USA"

73

Bil Harrison W2AVA

(P. S. That's me, unpacking the newest National NC-109!)

Matching Speaker $21.95; Plug in crystal calibrator $22.95; Plug in UHF Converters: 6 Meter Band $41.95; 2 Meter Band $43.95; 1¼ Meter Band $45.85. (Easy terms on accessories, too!)

SAVE $70.00!

ON THE NC-300

Regular Amateur Net-$399.00. Brand new, factory sealed, fully guaranteed—for only $329! Act fast—limited offer! Yours for as little as $12 A MONTH for 24 months, after payment of $41 down and low carrying charge.

DO YOU LIKE BARGAINS?

Of course, there's **always** plenty of true bargains at HARRISON's. But right now we're having a

BIG EXPANSION CLEARANCE SALE!

Lots more close-outs, mark-downs, and sensational bargains in equipment and parts. Come on in, and save plenty! **LOOK FOR THE YELLOW TAGS.**

SAVE $30.00!

NATIONAL NC-1(

In all the catalogs at $199 we can give it to you now only $169.95!

Yours for as little as $13 A MONTH for 12 months, after 1 down payment and low carrying charge. Matching Speaker $17 Crystal Calibrator $20.95.

SAVE $20.00!

NATIONAL NC-188

Outstanding value at $159.95, we have them brand new, latest production, for only $139.95. Fully guaranteed!

NO MONEY DOWN! Just CHARGE IT!

your Harrison Charge Account, and pay as little as one-tenth each reduced monthly balance.

DO YOU HAVE THE NEW HARRISON AMATEUR EQUIPMENT CATALOG? Ask for it, today!

"Ham Headquarters, USA" . . . Since 192

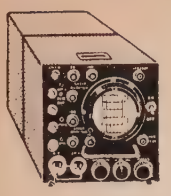
HARRISON

225 GREENWICH STREET

NEW YORK 7, N. Y.

PHONE: BARCLAY 7-7777

[LONG ISLAND—144-24 HILLSIDE, JAMAIC



BC-929 3" SCOPE INDICATOR COMPLETE

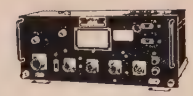
Originally used for IFF and Radar Navigation. Can be easily converted for general bench service work. Tubes included: 2-6SN7, 2-6H6, 1-6X5, 1-6G6, 1-2X2 and 3BP1 Cathode Ray Tube. A TERRIFIC BUY at our low price! **$9.95**

Excellent used $12.95

As Above, BRAND NEW $12.95

Conversion instructions for AC operation ..... .65

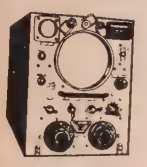
APN-1 FM TRANSMITTER-RECEIVER



420 to 460 Mc Aircraft Radio Altimeter Equipment. Tubes: 4—955, 3—12SJ7, 4—12SH7, 2—12H6, 1—VR150. Complete with all tubes and mount. For 27 V DC. **$8.95**

BRAND NEW .....

Original operating manual for above $1.00



LORAN APN/4 'SCOPE

Easily converted for use on radio-TV service bench.

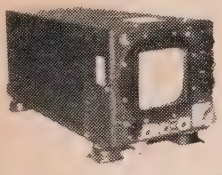
Completely Assembled

Supplied with 5" Scope, type 5CP1 only. **$14.95**

LIKE NEW! .....

Brand New **$19.50**

ASB-5 SCOPE INDICATOR

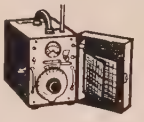


BRAND NEW, including all tubes, together with 5BP1 'Scope Tube. Originally used in Navy Aircraft RADAR equipment. Easily converted for AC operation.

VALUE $250.00!

OUR LOW PRICE **$15.95**

BC-906 FREQ. METER-SPECIAL



Cavity type, 145 to 235 Mc. BRAND NEW, complete with antenna. Manual incl. OUR LOW PRICE **$9.88**

SCR-274 COMMAND EQUIPMENT

ALL COMPLETE WITH TUBES

Type	Description	Used	LIKE NEW
BC-453	Receiver 190-550 KC	$14.50	$16.50
BC-454	Receiver 3-6 MC	9.45	12.45
BC-455	Receiver 6-9 MC	10.45	12.45
BC-450	3-Receiver Control Box	1.29	1.95

110 VOLT AC POWER SUPPLY KIT

For All 274-N and ARC-5 Receivers **$7.95**

Complete with metal case, instructions $11.50

SPLINED TUNING KNOB for 274-N and ARC-5 RECEIVERS. Fits BC-453, BC-454 and others. Only ..... **49¢**

BC-457 TRANSMITTER—4-5.3 Mc. complete with all tubes and crystal. BRAND NEW **$7.85**

BC-458 TRANSMITTER—5.3 to 7 Mc. complete with all tubes and crystal. BRAND NEW **$7.85**

BC-459 TRANSMITTER—7-9.1 Mc. complete with all tubes and crystal. BRAND NEW **$12.75**

ARC-5/T-19 TRANSMITTER—3 to 4 Mc. BRAND NEW complete with all tubes & crystal **$8.85**

BC-456 Modulator ..... USED 3.45 NEW 5.95

BC-451 Transmitter Control Box ..... 1.25 NEW 1.49

POWER SUPPLY KIT for All Command Sets, input 110 V 60 cy. AC. Top Quality $29.50

SEND TODAY FOR FREE CATALOG
of Additional "Hot" Ham Values!

Please include 25% Deposit with order—Balance C.O.D. 50c HANDLING CHARGE on Orders under $5.00 MINIMUM. All Shipments F.O.B. Our Warehouse N.Y.C. All merchandise subject to prior sale and price change.

G & G Radio Supply Co.

Telephone: CO 7-4605

53 Vesey St., New York 7, N. Y.

For further information, check number 55 on page 126.

stay in a fine and beautiful country, and countless hours of enjoyment! What other hobby is so great, so capable of fulfillment that it can give this great gift? It is certainly true: radio amateurs are the luckiest people in the world! Even to the stay-at-home, the key and the microphone open the doors to world adventure!

Grateful thanks are extended to the Hallicrafters Co., whose cooperation "above and beyond the call of duty" made the 3A2AF DX-pedition possible, thanks also to M. Andre Passeron, 3A2AT, of the Department d'Etat of Monaco for permission to operate in the principality and for his kind help in many of the details and procedures necessary to license a non-citizen. A salute and "thanks" to Hank, 3A2AH who supplied invaluable assistance and friendship to 3A2AF; to W9YFV and W9AMU who provided crash-shipments of antenna insulators, auto-transformers, etc., etc. in order to get 3A2AF on the air, and many 88 to Sunny who put up with all this foolishness, and finally obtained her own Monagasque radio license (3A2CY) in self-defense! ■

TCS [*from page* 36]

tion. All that is necessary to put the transmitter on 6 volts is to do the above modifications, change the 12A6's to 6V6's and make adapters by removing the bulbs of the 1625's and mounting a 5 prong socket inside the base connecting filament to filament, screen to screen, etc. Change the relays to 6 volt coils and you are in business. The power to operate this rig is a Carter unit 500 volts at 250 *ma*, with a vibrator unit mounted on it to give you the 225 volt necessary to operate the doubler stages. This power supply is diagrammed in fig. 14. The filament relay need not be changed for 6 volt operation.

If you have the dynamotor unit that comes with this set, the high voltage dynamotor can be rewired so that it will be on only during periods of transmissions. Fig. 15 shows these changes—the addition of one wire and the rerouting of another. To change the dynamotors to 6 volt operation, it is necessary to change the entire unit. Remove the 12 volt dynamotor and replace with a Carter unit or one removed from a VRC-2 or VRC-4 radio set. These dynamotors will fit exactly and no drilling or filing is necessary. The low voltage unit may be replaced with a small car radio vibrator supply and plenty of room is left to mount it after the low voltage dynamotor is removed. The wiring connections for both dynamotor and vibrator supply are made on the terminal board on the top of the chassis. The fuses are changed to 40 amperes on the high voltage side and 10 amperes on the low voltage side. The output can be increased to 60 watts by increasing the power input and the modulation transformer will hold up under

Parts List for Limited Conversion:

R-1—2.2 Meg ½ watt
R-2—1,500 Ohm ½ watt
R-3—31.5 Meg ½ watt
R-4—500,000 Ohms 1 watt
R-5—500,000 Pot
R-6—680 Ohms 1 watt
R-7—30,000 Ohms 1 watt
R-8—50,000 Ohms 50 watts
R-9—50,000 Ohms 50 watts

C-1—10 Mfd 25 volts
C-2—.1 Mfd 400 volts
C-3—.001 Mfd 400 volts
C-4—8 Mfd 450 volts
C-5—25 Mfd 50 volts
C-6—4 Mfd 600 volts
C-7—4 Mfd 600 volts
C-8—8-8 Mfd 450 volts

T-1—Interstage transformer
T-2—Merit P-3159
T-3—Merit P-2942
T-4—Merit P-2954
CH-1—Merit C-2974
CH-2—Merit C-2974
RY-1—DPST 6 volt AC relay

Parts List 150 Watt Conversion:

R-1 —2.5 Meg ½ watt
R-2 —1.55 ohm 1 watt
R-3 —1.5 Meg 1 watt
R-4 —250,000 ohms 1 watt
R-5 —500,000 ohm pot
R-6 —35,000 ohms 1 watt
R-7 —250 ohms 5 watt
R-8 —22,000 ohms 1 watt
R-9 —22,000 ohms 1 watt
R-10—47 ohms 1 watt
R-11—47 ohms 1 watt
R-12—100 ohms ½ watt
R-13—meter shunt
R-14—22,000 ohms ½ watt
R-15—22,000 ohms ½ watt
R-16—50,000 ohms 100 watts
R-17—50,000 ohms 100 watts
R-18—2,500 ohms 25 watts w/slider
R-19—25,000 ohms 25 watts

C-1 —10 Mfd 25 volts
C-2 —.1 Mfd 600 volts
C-3 —.001 Mfd 450 volts
C-4 —8 Mfd 450 volts
C-5 —25 Mfd 50 volts
C-6 —.001 Mica
C-7 —.001 Mica
C-8 —.001 disc
C-9 —.001 disc
C-10—.001 disc
C-11—See text
C-12—.001 disc 2500 volts
C-13—.001 Mica

T-1—Driver trans. Stancor
T-2—Modulation trans. See text
T-3—Merit P-3159
T-4—Merit P-3159
T-5—Merit P-2954
T-6—Merit P-2942
T-7—Merit P-2942
CH-1—Merit C-3188
CH-2—Merit C-2974
CH-3—Merit C-3188
CH-4—Merit C-2974
CH-5—Merit C-2974
T-8—Merit P-2948
RFC-1—2.5 mh R.F. choke
L-1—B&W 80 BEL
L-2—B&W 80 BVL
L-1—B&W 40 BEL
L-2—B&W 40 BVL

hese conditions. The relay under the dynamtor chassis should be changed to 6 volt operaon also. The wiring indicated by control unit fig. 15 will suffice to operate the transmitter rom a remote position or save stretching hen operating in motion if the transmitter is ocated out of reach of the driver. Incidentally, T-17 microphone will operate this rig as ill any push to talk carbon microphone.

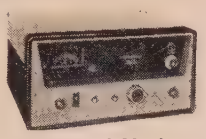
The Receiver

The receiver that comes with this unit is a ttle gem. It will require some work, but will ake a FB unit to complement with transmitr. While serving here as MARS director, I ave had the opportunity to modify quite a ew of these sets. One of our rigs is wired to se 6 volts mobile to work in any of our ehicles, and has been a boon on weekend amping trips and when it is back in the staon we just connect the cables to an *ac* power upply and we are in business. The mobile anna is a base loaded unit and the fixed staon antenna is a 135 foot job. We also use a 35 foot antenna on camping trips. ■

FOR THE BEST DEAL

WRITE
WIRE
PHONE

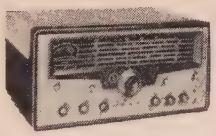
STAN WØBJV



The **ALL NEW HT-33A LINEAR AMPLIFIER** from Hallicrafters. Complete coverage of amateur bands; 80, 40, 20, 15, 10 meters. For full details see Pages 10-11, January, 1959 CQ.....**$795.00**

The **ALL NEW HT-32A** Transmitter fresh from Hallicrafters. Complete coverage of amateur bands; 80, 40, 20, 15, 10 meters. See Pages 10 and 11 January, 1959 CQ for complete details and features... .....**$695.00**

HALLICRAFTERS



SX-101A has all the features of the original SX101 **PLUS** — S-meter zero point independent of sensitivity control, separate AM and SSB-CW Detectors, direct coupled series noise limiter operating on all modes of operation, 2 position AVC switch (Fast and Slow). **$399.50**

SR-34. Complete two and six meter station. Features transistorized, built-in power supply. See Page 10, November '58 CQ for complete details. Check with Burghardt Radio Supply for prices and trade-in offer
..... $495
SR34AC **$395**

Burghardt RADIO SUPPLY, Inc.

P.O. Box 746
Watertown, S. Dak.
Turner 6-5749

For further information, check number 56 on page 126.

Advertising Index

All About Missiles and Satellites 93
Allied Radio Corp. 128
Alltronics-Howard Co. 113
Ameco Div. Antennavision, Inc. 86
American Crystal Co. 111, 113
Arenburg Ultrasonic Laboratory, Inc. 113
Automation Electronics 110

Barker & Williamson, Inc. 106
Barry Electronics Corp. 114, 115
Bud Radio, Inc. 110
Burghardt Radio Supply 100, 125

Centimeg Electronics, Inc. 105
Central Electronics Inc. 23
Cleveland Institute of Radio Electronics 10
Collins Radio Co. ..... Cover 2
Communications Associates 113
Cornell-Dubilier Elec. Corp. 12
Cotter, Hermon E. 111
CQ Back Issues 101
CQ Ham Shop 98, 99
CQ Subscription Ad. 109

Delehanty Institute 113
Dunlap Electronics, Inc. 112
Dow-Key Company, Inc. 104

EICO 14
Eitel-McCullough, Inc. 17
Eldico Division 26, 91
Electro Dial Co. 112

G & G Radio Supply Co. 124
Gem Electronics 101
Glas-Line Company 121
Globe Electronics 25
Gonset Co. 11, 19
Groth, R. W. Mfg. Co. 112

Hallicrafters Co. 13
Hammarlund Mfg. Co., Inc. 15
Harrison Radio Corp. 123
Harvey Radio Co., Inc. 97
Heath Company 4, 5, 6, 7, 8
Henry Radio Stores 94
Hornet Antenna Prod., Co. 104
Hy-Gain Antenna Prod. 18

Instructograph Co. 112, 118
International Crystal Mfg. Co. 21
Irving Electronic Co. 90

Jet Crystal Company 105
Johnson, E. F. Co. 27, 28, 29

Ken-Els Radio Supply Co. 107
Kwik-Patch 111

Lakeshore Industries 109
Lampkin Laboratories, Inc. 111

Mark Mobile, Inc. 103
Master Mobile Mounts, Inc. 22
Master Service 102
Microwave Associates, Inc. 108
Millen, James Mfg. Co., Inc. 2
Missile Manual & Guide 87
Mosley Electronics, Inc. 24

Nassau Electronics, Inc. 120
National Company, Inc. ..... Cover 3
The Neil Co. 107

P & H Electronics 20, 120
Palmer, Joe 103
Petersen Radio Co., Inc. 1
Poucel Electronics Co. 102

RCA Electron Tube Div. ..... Cover 4
R W Electronics 119
Radio Bookshop 86
Radio Engineering Laboratories, Inc. 26, 91
Radio Ham Shack, Inc. 88
Radio Publications, Inc. 96
Radio Shack Corp. 116, 117
Rohn Mfg. Co. 118

Shure Brothers, Inc. 16
Sky-Lane Products 86

TAB 127
Telrex, Inc. 110
Turner Microphone Co. 92
Trading Post
- Alltronics-Howard 108
- H & H Electronic Supply, Inc. 108
- Henry Radio Stores 108
- Ken-Els Radio Supply Co. 108

Van Sickle Radio Supply Co. 111
Vesto Co., Inc. 101

Western Radio Co. 121
World Radio Labs, Inc. 89, 95

READER SERVICE

CQ Magazine, Dept. RS

300 West 43rd Street
New York 36, N. Y.

Coupon I
Void after
Sept. 25, 1959

Please send me information on your ads in the September 1959 CQ keyed as follows:

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63

A B
C D

Name _____
(Please Print)

Call _____ Engineer ☐

Type of work (specify) _____

Address _____

City _____

Zone _____ State _____

ew "TABTRAN" Rectifier Xfmrs

l Volts (DUAL†) 0-9-15-18-&-0-9-15-
Series Sec'ds 0-3-6-9-12-15-18-21-24-
)-33-36 Volts.

Write for Rectifier Catalog

)01 @ 1 Amp† ea/sec/winding $5.15
)02 @ 2 Amp† ea/sec/winding $7.15
)03 @ 5 Amp† ea/sec/winding $9.90
)gs in Series at Ratings shown: Par-
2X Current. Voltage output. 0-9-15-18

ENIUM F.W. BRIDGE RECTIFIERS

P	18VAC 14VDC	36VAC 28VDC	72VAC 54VDC	130VAC 100VDC
2	$1.00	$1.90	$3.85	$5.00
1	1.30	2.00	4.90	8.15
2	2.15	3.00	6.25	11.10
3	2.90	4.00	8.60	13.45
6	4.15	8.00	18.75	31.90
0	6.10	12.15	26.30	41.60
2	7.75	14.90	30.95	43.45
0	12.85	24.60	49.90	76.75
4	15.00	29.45	57.50	81.15

Electro A-1
New Silicon 500Ma Rectifiers, Complete Range RMS ACV Input

/piv	rms/piv	rms/piv	rms/piv
/50	70/100	140/200	210/300
¢	54¢	63¢	81¢
/piv	rms/piv	rms/piv	rms/piv
/400	350/500	420/600	490/700
¢	$1.25	$1.60	$1.90
/piv	rms/piv	rms/piv	rms/piv
/800	630/900	700/1000	770/1100
0	$2.40	$3.25	$3.90

n Bridge or C.T. up to 750ma dc
Qtys Deduct 20% on $10 Orders
Postpaid 48 States order $10

FIERS 130V/RMS HALF-WAVE

49¢, 5 for $2; 100Ma 59¢, 6 for $3
a 70c, 8 for $5; 250Ma 79c, 6 for $4
a 88c, 5 for $4; 350Ma $1.00, 8 for $7
a $1.10, 5 for $5; 500Ma $1.35, 5 for $5
Postpaid 48 states orders $10.

NEW DC POWER FOR TRANSISTORS!!

New low-cost 25 volt one amp filtered 1% ripple power supply. Same as specified CBS, G.E., RCA. Ideal for ing transistor circuits. Pre-assembled -build B25V1ACK $10, or assembled LAC $12.

"—THAT'S A BUY!—BARGAINS!!

H/MYLAR Tape 2400 ft ..... 3/$12
SR Oil/W.E. 2mfd@600WVDC 6/$1
PERSCOPE TUBE 2" ..... $5@ 2/$9
INE FILTER 10A $1.50, 50A/$10
FAN 6 or 12VAC/60Cys $2@, 3/$5
N-MUMETAL Scope Shield $ 4.00
PRINT CKT-PANEL, 11x12x.062" $2
TAPE 1200' HiQlty. ..... 3 for $5
PASS 60 or 90 or 150 Cys each $2
45¢@, 15/$5; 1N35 $1; IN38 70¢@;
OVEN—115V&Thermostat $2
24VDC/100CFM $3.98
AC/Miniature 6&12VAC $1.00
ng Mica's .006 @ 2500V, 5 for $1.00
2.5MH/2.5&5Mtr Chokes ....8/$1.00
ors 6 or 12VDC $1.49@; 4/..... $5.00
Variacs/or equiv 0-135V/7.5A $15.30
ariacs/or equiv 0-135V/3 Amp $10.65
Variacs/or equiv 0-132V/1.25A $7.25
TR GE/475 Ma & 5 Amp $4@, 2/$7
ETER Dejur 800 Ma/3½" $3@, 2/$5
ETER One Ma/4" Rd. $5@, 2/$8
TR Weston 750Ma/TC....$4@, 2/$6
TR 100Ma/2½"..... $3@, 2/$5
/3 to 4 mc's good condition $5.95
R2/RCVR less tubes A-1 endtn $2.95
SN 200-400 Mcs Revrs As Is ...$25
MPN rcvr covers 4 bands 1.5 to 9
tubes has BFO Vernier..... $24.00
/IF-Strip $5.00
RS-1 Side Band Selector $45
Socket 85¢, 2/$1.50. 813 Socket $1
Ceramic/LOKTAL..... 2 for $1.00

NSFORMERS all 115V/60cy/1Ø

3A, 5V @ 3A & 1200VCT@200ma $5
40VCT @ 30ma/6.3V @ 2A..... $2
/500VCT @ 70ma & 6.3V @ 4A $3
/550VCT @ 250ma & 6.3VCT @
& 12.6V @ 3.5A, & 5V @ 2A $5
2.5VCT @ 10A/5KV..... $4
2/x16V @ 1A ea..... $3.45
3 10VCT/5A or 220V Pri 20V @ 5A
H'sld..... Special $4.95, 2 for $9

0VCT@10A, 680VCT@40MA $4.95
0VCT@10A, Pri 105/15/25V $4.00
x5V@10A each or 10VCT/10A $4.50
6.3VCT@15.5A&6.3VCT@2A $3.50
/2.2Hy@450Ma/DCR26Ω/2KV$4.50
ted 304 Tubes & ALL Types!!!

"TAB"
THAT'S A BUY

"TAB" Tubes Tested, Inspected, Boxed
Six Months Guaranteed!! No Rejects!

GOVT & MFGRS Surplus! New & Used

0A2	.70	6BZ7	1.25	*We Buy & Sell*	
0A3	.80	6C4	.45	43	.75
0B2	.65	6C5	.69	45	.49
0C3	.70	6C6	1.08	50L6	.69
0D3	.50	6C8	1.08	RK59	1.39
0Z4	.60	*We Trade!*		RK60	1.17
1A7	.90	6CB6	.80	HY69	2.20
1B3	.78	6CD6	1.49	75	.81
1L4	.82	6CF6	.85	HY75	5.00
1R4	5/$1	6CL6	1.40	83	.95
We Swap Tubes!		*What Do/U Have?*			
1R5	.78	6CG7	.89	4PR60A	.37.50
1S4	.78	6CG8	1.12	4-125A	.27.50
1S5	.68	6CM6	.79	4X150A	..2/$9
1T4	.85	6CS6	.70	4X250B	.41.00
1T5	.95	6CU6	1.29	4-400A	..41.75
1U4	6/$1	6D6	.99	4E27A	...39.00
1U5	.75	6E5	.79	250TL	..19.45
1X2	.90	6F4	2.49	307A	....2/$1
2C39A	9.00	6F5	.63	316A	....5/$1
2C40	5.50	6F6	.99	VR92	....5/$1
Send 25¢ for Catalog!					
2C43	6.50	6F7	.99	388A	....3/$1
2C51	2.00	6F8	1.39	350A	....2.45
2D21	.65	6H6	.59	350B	....1.75
2E22	1.75	6J4	1.72	371B	95
2E24	1.90	6J5	.59	5146	....3.90
2E25	2.50	6J6	.59	416B	...16.00
2E26	2.75	6J7	.99	450TH	...43.00
2E30	1.75	6J8	1.39	450TL	...43.00
2E35	1.60	6K6	.59	460	...11.50
2K25	9.75	6K7	.79	701A	....3.95
Wanted Receivers and XMTRS					
2K26	...34.00	6K8	.99	703A	....2.00
2K28	...30.00	6L6	1.19	707B	....3.50
2V3	....2/$1	6SN7	.72	715C	...10.90
2X2	.48	6T8	.98	717A	....5/$1
3A4	.70	6V6GT	.90	723AB	....5.00
3A5	1.00	6X5	.49	725A	....2.75
3API	5.95	12AT6	.59	801A	....5/$1
3BP1	3.90	12AT7	.89	803	....3.50
3C24	3.50	12AU6	.63	804	....8.85
3D23	3.95	12AU7	.69	805	....6.00
We Buy!		*We Sell!*		*We Trade!*	
3E29	6.00	12AX7	.79	807	1.10
3Q4	.68	12AY7	1.29	5/$5, 10/$12	
3Q5	.86	12B4	.95	811	3.45
4-65A	...13.50	12BA6	.65	811A	4.41
4-125A	...27.50	12BA7	.99	812	3.30
4-250A	...34.00	12BD6	.59	813	8.00
4X150A	...7.00	12BE6	.59	814	2.35
4X250	...36.00	12BH6	.79	815	3.15
4X500	...37.00	12BH7	.99	826	.59
5API	2.95	12BY7	1.00		
Wanted Test Sets and Equipment					
5BP1	5.02	12BZ7	.99	828	9.00
5BP4	5.00	12H6	.75	829B	8.00
5CP1	4.99	12J5	.69	832A	6.00
5CP7	9.00	12J7	.69	833A	...36.00
5R4	1.00	12J8	1.35	837	....2/$2
5T4	.90	12K8	.89	866A	1.50
5U4	.59	12SA7	.69	954	...10/$1
5V4	.89	12SC7	.89	955	....3/$1
5Y3	.60	12SF5	.69	957	....3/$1
5Z3	.89	12SG7	.89	958A	....2/$1
Send 25¢ for Catalog!					
15GP22	.89.00	12SH7	.89	991	....5/$1
6A7	1.00	12SJ7	.75	1614	....2.00
6A8	.99	12SK7	.75	1619	....5/$1
6AB4	.59	12SL7	.79	1620	....2.00
6AC7	.72	12SN7	.69	1625	....5/$1
6AG5	.65	12SQ7	.69	1626	....5/$1
6AG7	.75	12SR7	.69	1629	....4/$1
6AK5	.69	15E	1.19	2050	....1.25
6AL5	.59	15R	....4/$1	5517	....1.25
6AQ5	.66	FG17	3.49	5608	....3.95
Top $$$ Paid for 304TL tubes					
6AR6	1.95	19T8	1.16	5618	....3.25
6AS7	3.49	24G	3.50	5651	....1.35
6AT6	....2/$1	25A6	1.19	5654	....1.20
6AU6	.79	25A7	2.19	5656	....4.25
6B8	1.35	25C5	.81	5663	....1.15
6BA6	.59	25L6	.72	5670	90
6BE6	.59	25T	4.00	5686	....1.75
6BG6	1.49	25Z5	.72	5687	....1.15
6BH6	.79	25Z6	.75	5691	....4.70
6BJ6	.72	26A7	3.69	5725	....1.95
Top $$$ Paid for XMTR Tubes!					
6BK7	.99	PG27	8.28	5732	....2.00
6BL7	1.35	HV27	...19.39	5736	...85.00
6BN4	.69	28D7	.89	5749	....1.95
6BN6	1.08	FG33	...15.00	5750	....2.75
6BN7	1.99	EL34	3.49	5751	....1.25
6BQ6	1.19	35A5	.69	5814	....1.20
6BQ7	.99	35L6	.59	5879	....1.20
6BX7	1.11	35T	4.49	5894	...$12.00
6BY5	1.19	35Z5	.89		
6BZ6	.91	RK39	2.99	No See—Write!	

"TAB" TERMS: Min Order $3—25% with order F.O.B. New York. Ten day guarantee, price of mdse. only. Our 14th year.

Prices shown are subject to change.

111CV Liberty St., N.Y. 6, N.Y., RE 2-6245

"TAB" FOR THE BEST KITS!

KITS! *Each "TAB" Kit Contains The Finest Selection!!!*

Order Ten Kits We Ship Eleven!!!

Kit 5 Mycalex Glass/HF Strips
Kit 35 Precision Resistors
Kit 10 Switches
Kit 75 Resistors ½/1/2W
Kit 150 Carbon Resistors
Kit 25 Panel Lamps
Kit 12 Electrolytic Cond's
Kit 15 Volume Controls
Kit 56 Tube Sockets
Kit 65 Tubular Condensers
Kit 500 Lugs & Eyelets
Kit 10 Bathtub Oil Cond's
Kit 5 lbs. Surprise Package
Kit 10 Transmit Mica Cond's
Kit 6 Glyptal & Cement
Kit 3 Phone/Patch Xfmrs
Kit 3 Search Lights
Kit 4 AM/Reflector Lites
Kit 6 Instld Tuning Tools
Kit 6 AN Plugs & cnnctrs
Kit 5 Asstd Screw Drivers

Kit 5 Sub-Min Tubes
Kit 30 Standoff Insulators
Kit 5 pcs Wrench Set
Kit 8 pcs Nut Driver Set
Kit 25 Mica Condensers
Kit 5 Hi Gain Xtal Mike
Kit 5 Jeweler Screwdrivers
Kit 6 ea Phonoplugs & Jacks
Kit Silver Conduct Paint
Kit 6 Multi-Color Ball Pens
Kit 18 Lo-Cap 2 Cond M-Cable
Kit 20 ft RG59U Coax Cable
Kit 15 ft RG11U Coax Cable
Kit 2 pair SO239 & PL259
Kit 2 Binding Posts Asstd
Kit 3 Phone Jacks Asstd
Kit 3 Phone Plugs Asstd
Kit Long Nose Plier
Kit 5 UG/Connector Asstd
Kit Xmtr Variables

Kit 5 Asstd 100 Ceramic Condensers
Kit 100 Fuses, assorted Color
Kit 4 Rolls, 50ft/ea. Asstd Color
Kit 5 FT243 Xtal Holders
Kit 65 Inductors & Coils
Kit 5 Microswitches
Kit 10 Wheat Lamps
Kit 3 Transistor Xtmrs
Kit 8 Xtal Ose-Blanks
Kit 4 Asstd Rectifiers
Kit 12 Alligator Clips Asstd
Kit 5 UG/Connectors Asstd
Kit 100 Self/Tap Screws
Kit Adj Wirt Striper & Cut

Kit 2 Bakelite Panels 6x12"
Kit 5 pcs Wrench Set
Kit 8 pcs Nut Driver Set
Kit 25 Mica Condensers
Kit Hi Gain Xtal Mike
Kit 5 Jeweler Screwdrivers
Kit 6 ea Phonoplugs & Jacks
Kit Silver Conduct Paint
Kit 6 Multi-Color Ball Pens
Kit 25 ft Lo-Cap Mike Cable
Kit 20 ft RG59U Coax Cable
Kit 15 ft RG11U Coax Cable
Kit 2 pair SO239 & PL259
Kit 2 Binding Posts Asstd
Kit 3 Phone Jacks Asstd
Kit 3 Phone Plugs Asstd
Kit Long Nose Plier
Kit 5 UG/Connector Asstd
Kit 5 of 2mfd @ 600wvdc/oil

ONE FOR EACH ABOVE KIT ONLY **99c**

W.E. 416B Microwave Triode up to 4000 Mcs. **High Transconductance 25 to 50000 mhos** use as pre-amp, mixer or oscillator HiMu—Low Noise, (Gvt Cost $58) Tubes removed from Equipment & Tested! SPECIAL **$6 ea, 2/$10**

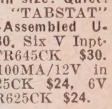
"TAB" for NEW TRANSISTORS!

2N38	$.98	2N442	$5.00	2N441	$3.00
2N155	3.25	2N256	1.45	2N234A	1.36
2N156	4.45	2N277	4.50	2N422	5.00
2N174	12.00	2N278	5.50	CK722	.95

Postpaid 48 States Orders $10

4X150A Special **$5.00** ea. 2 for **$9.00**
4X150A & Eimac Air System Socket & Chimney **$8.00**
Eimac Teflon Socket **$4.00**, Dual **$7.00**

TRANSISTORIZED DC POWER! HI-EFFICIENCY DC to DC to 450 VDC "TABSTAT" KIT or BUILT!



Output 450 & TAP 250VDC at up to 150 MA/Up to **70 Watts** 80% efficiency: ripple 0.2%; low idle current one amp silicon rectifiers, oil condensers, toroid transf. fused & short circuit proof. Regulation 5% at 20 to 100% load!! **Small in size! Quiet! Light wgt! Lo-priced gtd** "TABSTAT" TR1245CB built $35. **Pre-Assembled U-Build** kit TR1245CK **Only $30.** Six V Inpt-TR645CB **$35 or Kit** TR645CK **$30.** "TABSTAT" 250VDC @ 100MA/12V in TR1225CB **$27, Kit** TR1225CK **$24,** 6V inpt TR625CB **$27, Kit** TR625CK **$24.**

Wanted 304TL Tubes & ALL TYPES!!!

"TAB" GUARANTEED XTALS!

HAM BAND 80 or 40Mtrs..... $1@
CITIZENS BAND ..... $3@
Include 1st, 2nd, 3rd & 4th choice!
Buy Qtys Deduct 20% on $10 Orders!
Postpaid 48 States on $10 orders
WE BUY! SELL & TRADE
Send 25¢ for Bonus Catalog!

free...

ALLIED'S

VALUE-PACKED 1960 ELECTRONIC SUPPLY GUIDE

everything FOR THE AMATEUR

Send for the 1960 ALLIED Catalog—the most widely used Electronic Supply Guide for Amateurs. You'll want it handy always—to fill all your station needs—to supply you with *everything* in electronics at lowest, money-saving prices. The 1960 ALLIED Catalog features the largest and latest selection of receivers, transmitters, electron tubes, semi-conductors, test instruments, money-saving KNIGHT-KITS, everything in stereo hi-fi, P. A. equipment, recorders, electronic parts, tools, books and specialized equipment for industrial use.

one order to Allied fills the whole bill

Save time, effort and money: fill *all* your electronic supply needs from your 1960 ALLIED Catalog...

free... send for it!

have every buying advantage:

HIGHEST TRADES: You always get the top trade at Allied. Just write to "Trader" Jim Sommerville, W9WHF, and tell him what you want—he'll come up with the best deal.

LARGEST STOCKS: Get *everything* from our complete stocks of Ham gear and electronic supplies—choose from *all* the dependable lines—get *fastest service* anywhere.

HAM-TO-HAM HELP: Our staff of over 35 Hams, led by Jack Schneider, W8CZE, will go all-out to give you the help you want. You'll like the friendly attention and interest you get *all-ways* at Allied.

SEND FOR our lists of top buys in reconditioned Ham gear. We trade BIG, so we always have on hand outstanding buys in fine reconditioned equipment. Ask for our lists.

NEW LOWER TERMS: Only $5 down (or less) on all orders up to $200; up to 24 months to pay. Fast handling—no red tape. *Extra*: 15-day *free* trial on all equipment.

ALLIED RADIO

100 N. Western Ave., Chicago 80, Ill.

serving the Amateur for 39 years

For further information, check number 58 on page 126.

NEW NATIONAL NC-303

NEW front panel SSB selector with exclusive, new "IF SHIFT" for instant sideband choice . . . eliminates retuning or detuning.

NEW "Q" Multiplier provides razor-sharp rejection notch (more than 60 db deep). May be tuned continuously across entire receiver passband. Separate notch frequency and notch depth controls.

NEW 5-position IF selector provides sharp, SSB-1, SSB-2, medium and broad selectivity. .5 Kc, 2 Kc, 4 Kc and 8 Kc bandwidths provide optimum selectivity for SSB, CW, phone, phone net and VHF plus sideband selection.

NEW dual noise limiters. Separate automatic noise limiters for AM. Separate double-ended manual limiter for CW and SSB.

NEW tone switch provides for attenuation of highs, lows, or both for maximum readability.

NEW exclusive WWV converter provision. No interference with dial calibration or frequency coverage. Accessory calibrator provides one microvolt sensitivity on 10 mc WWV frequency.

NEW hi-speed, 40-1 tuning dial with logging scale.

NEW fine tuning vernier dial drive provides super-precision for CW and SSB tuning.

ADDITIONAL FEATURES:

Dual conversion on all bands. Crystal controlled 2nd converter oscillator. Giant, slide-rule dial with ten dial scales covers 160 to 1¼ meters, easily readable to 2 kc without interpolation up to 21.5 mc. Exclusive converter provision for 6, 2 and 1¼ meters. Separate linear detector for SSB, will not block with RF gain full open. Giant "S" meter. Provision for external control of RF gain automatically during transmitting periods. Muting provision for CW break-in operation. Calibration reset adjustable from front panel. Socket for plug-in crystal and WWV calibrator. Accessory socket for powering converters and future accessories. Fifteen tubes including rectifier.

For further information, check number 2 on page 126.

Only $44.99 down*

Suggested cash price: $449.00
(slightly higher west of the Rockies)
(and outside the U.S.A.)

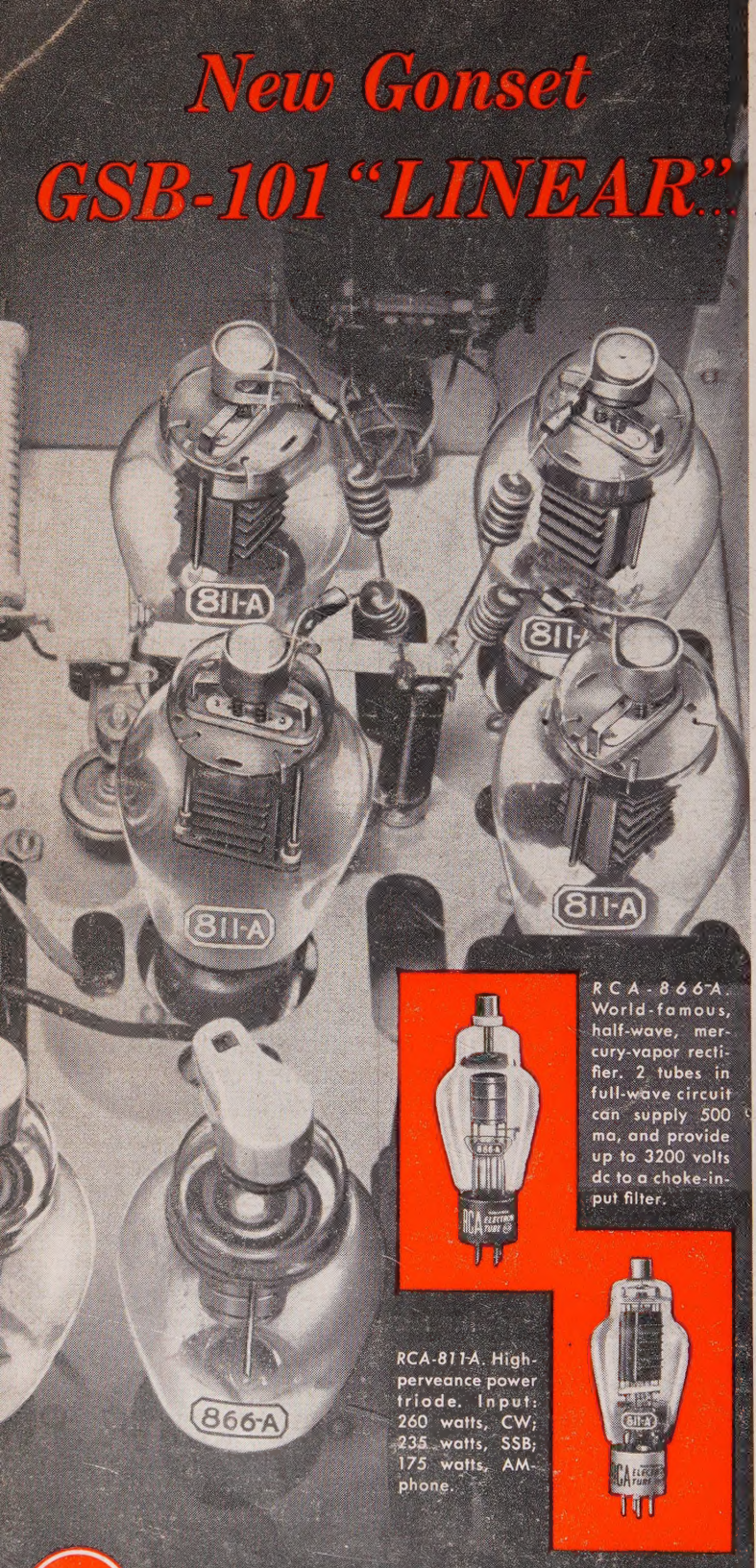
*Most National Distributors Offer Budget Terms and Trade-In Allowances.

National

NATIONAL RADIO CO., INC.
MELROSE 76, MASS.

New Gonset GSB-101 "LINEAR"...

...uses RCA-811 and RCA-866



RCA-866-A. World-famous, half-wave, mercury-vapor rectifier. 2 tubes in full-wave circuit can supply 500 ma, and provide up to 3200 volts dc to a choke-input filter.

RCA-811-A. High-perveance power triode. Input: 260 watts, CW; 235 watts, SSB; 175 watts, AM-phone.

Capable of deliver single-sideband signa carries the authority POWER, Gonset's new 101 Linear Amplifi what it takes to do t Four RCA-811-A's in allel, cathode-drive "look" into the pi-n output. And 2 RCA rectifiers in the pow ply handle the dc load

Why RCA-811-A's They're high-pervea sign—take full powe at moderate plate v (2) They're high-mu mit class B SSB ser cathode-drive circu low bias.

Why RCA-866-A's They're conserva rated. (2) They hav peak-emission capab

RCA-811-A's and 86 and all RCA Power a tifier Tubes—are a at RCA Industrial Tu tributors everywher

RADIO CORPORATION OF AMERICA
Electron Tube Division Harrison, N. J.

For the name of yo RCA Industrial Tube D call Western Union and ask for Operato